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MOJAVE-KERN RIVER-EL DORADO
Natural Gas Pipeline Projects

Final Supplement to the Final Environmental Impact Report/Statement

VOLUME VI
WyCal Supplement

CALIFORNIA STATE LANDS COMMISSION
FEDERAL ENERGY REGULATORY COMMISSION

October 1988

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VOLUME VI

WyCal Supplement

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Wyoming-California Pipeline Company) Docket Nos. CP87-479-000, CP87-480-000

Mojave Pipeline Company, et al.) Docket Nos. CP85-437-000, et al.

Kern River Gas Transmission Company, et al.) Docket Nos. CP85-552-000, et al.

NOTICE OF AVAILABILITY OF THE FINAL WYCAL SUPPLEMENT TO THE MOJAVE-KERN RIVER-EL DORADO FINAL ENVIRONMENTAL IMPACT REPORT/STATEMENT (WYCAL SUPPLEMENT) AND NOTIFICATION OF SCHEDULE FOR COMMENT ON THE FINAL SUPPLEMENT

October 3, 1988

Notice is hereby given that the Federal Energy Regulatory Commission (FERC) and the California State Lands Commission (SLC) have issued a joint Final WYCAL Supplement to the Final Environmental Impact Report/Statement (FEIR/S) which was made available in December 1987 for the then various proposals to transport natural gas from various sources outside California to the Bakersfield, California area for use in enhanced oil recovery (EOR) and related cogeneration projects.

Background

On August 4, 1987, Wyoming-California Pipeline Company (WyCal) filed an application with the FERC to transport natural gas from various sources outside of California to the Bakersfield, California area for use in EOR and related cogeneration projects. Two other projects to supply natural gas to the same Bakersfield area were the subject matter of the FEIR/S issued in December 1987. Specifically, Kern River Gas Transmission Company (Kern River) proposed to build an 837 mile pipeline (Docket No. CP85-552-000) and Mojave Pipeline Company (Mojave) proposed to build a 389 mile pipeline (Docket No. CP85-437-000). On December 14, 1987, the FERC issued a Notice of Intent to Prepare a Supplement to the FEIR/S in order to analyze the WyCal project and stated that the Supplement would address only those aspects of the Wycal project not previously addressed in the FEIR/S for the Kern River and Mojave projects.

The proposed WyCal pipeline deviates from Kern River's proposal at the northern end of the project from Opal to Evanston, Wyoming for approximately 55 miles. From that point on, except as noted below, WyCal proposes to follow the very same right-of-way (ROW) which Kern River proposed from a point approximately 5 miles east of Evanston, Wyoming to Kern River's proposed milepost (MP) 491 where it would intersect with the East Las Vegas System Alternative route identified in the FEIR/S. WyCal would follow the very same ROW examined along this alternative to Piute Junction, California where it would interconnect with the route proposed by Mojave. WyCal then proposes to follow the exact same ROW which Mojave proposed both east to Topock, Arizona and west to Bakersfield, California. Since the proposed WyCal project is on the very same ROW proposed by both Kern River and Mojave in many areas, a significant amount of work has already been completed relevant to the environmental impact caused by the construction and operation of the pipeline. The Supplement was therefore structured in such a way as to tier or build upon the FIER/S issued in December 1987. The Draft Supplement, issued by FERC on July 25, 1988, and noticed by the Environmental Protection Agency on July 29, 1988, in the Federal Register only addressed those areas of the WyCal project which deviate from the Mojave and Kern River proposals and the East Las Vegas route alternative previously analyzed in the FEIS. A route variation identified in the FEIS as the Wasatch Variation was re-examined in the Supplement as well as deviations of compressor site locations. Public meetings to receive comments on the Draft Supplement were announced and subsequently held on August 22 and 23, 1988, in Las Vegas, Nevada and Salt Lake City, Utah, respectively.

Commenting on the Final Supplement

As with the FEIR/S, the Final Supplement will be used in the regulatory process at both the FERC and SLC. On August 2, 1988, the FERC established by Commission order that those wishing to file comments on the Final Supplement with the Commission must do so by October 15, 1988. Further, anyone wishing to file reply comments must file them with the Commission by October 31, 1988. Comments should be sent to the Office of the Secretary, Federal Energy Regulatory Commission, 825 North Capitol Street, N.E., Washington, D.C. 20426. While the period for filing motions to intervene in these cases has expired, motions to intervene out-of-time can be filed with the FERC in accordance with the requirements of the Commission's Rules of Practice and Procedure, 18 CFR 385.214(d). Further, anyone desiring to file a protest with the FERC should do so in accordance with 18 CFR 385.211.

The Final Supplement has been placed in the public files of the FERC and SLC and is available for public inspection in the FERC Division of Public Information, Room 1000, 825 North Capitol Street, N.E., Washington, D.C. 20426 and at the SLC, 1807-13th

Street, Sacramento, CA 85814. Copies have been sent to the interested members of the public, all parties to the proceeding, and Federal, state, and local officials, and are available in limited quantities from the FERC's Division of Public Information and from the SLC.

Additional information about the project is available either from Mr. Robert Arvedlund, FERC Project Manager, Environmental Analysis Branch, Office of Pipeline and Producer Regulation, Room 7312, telephone (202) 357-9091, or Ms. Mary Griggs, SLC Project Manager, telephone (916) 322-0354. A copy of all initial and reply comments should also be sent to Mr. Arvedlund.

James F. Trout

JAmes F. Trout
~~Claire T. Dedrick~~
Asst. Executive Officer, SLC

Lois A. Cashell

Lois Cashell
Acting Secretary, FERC

MOJAVE-KERN RIVER-EL DORADO NATURAL GAS PIPELINE PROJECTS FINAL EIR/EIS AND FINAL WYCAL SUPPLEMENT

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ABBREVIATIONS AND ACRONYMS

ALJ	Administrative Law Judge
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulation
COM	Construction, Operation, and Maintenance
CPUC	California Public Utilities Commission
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency
FEIR/S	Final Environmental Impact Report/Statement
FERC	Federal Energy Regulatory Commission
F.R.	Federal Register
ISA	Instant Study Area
ISO	International Organization for Standardization
hp	horsepower
MFR	Mountain Fuels Resources, Inc.
MMCFD	Million cubic feet per day
MP	Milepost
NEPA	National Environment Policy Act
NL	Northern Leg - WyCal Mainline
NOI	Notice of Intent
NOP	Notice of Preparation
OC	Optional Certificate
O.D.	Outside Diameter
PMOA/MOA	Programmatic Memorandum of Agreement/Memorandum of Agreement
ROW	Right-of-way
SHPO	State Historic Preservation Officer
SLC	State Lands Commission, California
UP&L	Utah Power and Light Company
USFWS	U.S. Fish and Wildlife Service
WL	Western Leg - WyCal Mainline

SUMMARY

S.1 INTRODUCTION

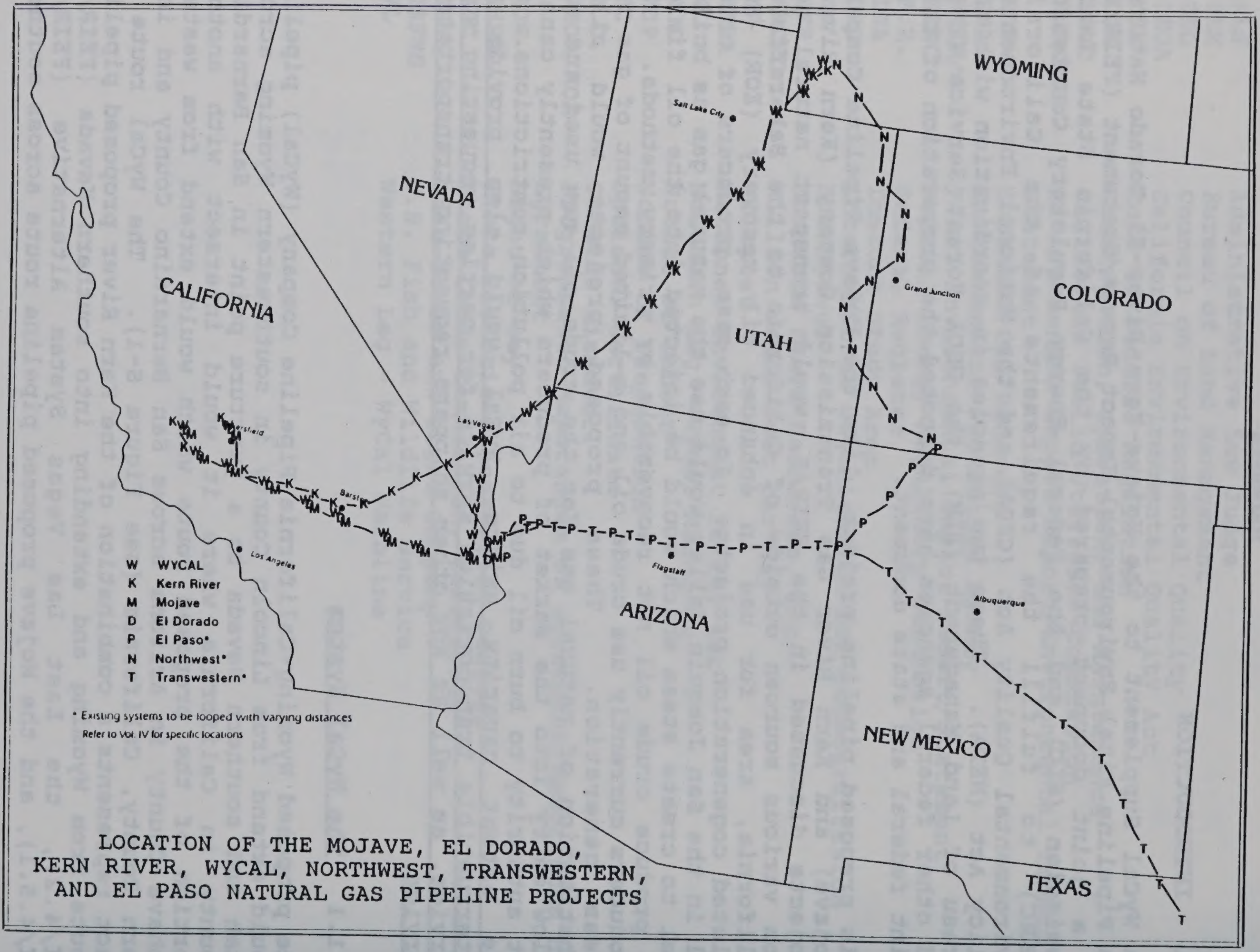
The WyCal Supplement to the Mojave-Kern River-El Dorado Natural Gas Pipeline Final Environmental Impact Report/Statement (FEIR/S) is a joint document prepared by the California State Lands Commission (SLC) and the Federal Energy Regulatory Commission (FERC) to fulfill the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). These two agencies in coordination with the Bureau of Land Management (BLM), the USDA Forest Service (FS), and other federal agencies have directed the preparation of this joint federal and state document.

This proposed pipeline project, like the Mojave Pipeline Company (Mojave) and Kern River Gas Transmission Company (Kern River) projects discussed in the FEIR/S, would transport natural gas from various sources outside of California to the Bakersfield, California, area for use in enhanced oil recovery (EOR) and related cogeneration projects. In each case, producers of crude oil in the San Joaquin Valley would use the natural gas as boiler fuel to create steam which would be injected into the oil fields to produce crude oil not recoverable by primary methods. The producers currently use crude oil and a limited amount of gas for steam generation. These proposed projects would allow substitution of natural gas for the crude oil now used and may allow entry into the market of producers which presently cannot get authority to burn oil due to air pollution restrictions. To the extent capacity exists, WyCal would also provide an interruptible transportation service for parties requesting such service, as well as any other shippers requesting transportation service.

S.1.1 The WyCal System

The proposed Wyoming-California Pipeline Company (WyCal) pipeline would extend from Lincoln County in southwestern Wyoming across Utah and southern Nevada to a juncture point in San Bernardino County in California where it would intersect with another portion of the proposed route which would extend from western Mohave County in Arizona across San Bernardino County and into Kern County, California (see Figure S-1). The WyCal route in fact represents a combination of the Kern River proposed pipeline route from Wyoming and extending into southern Nevada (FEIR/S, II/4.2), the East Las Vegas System Alternative (FEIR/S, II/4.5.1), and the Mojave proposed pipeline route across southern

Figure S-1


WYOMING
NEVADA
UTAH
COLORADO
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
Salt Lake City
Grand Junction
Las Vegas
Bakersfield
Barstow
Los Angeles
Flagstaff
Albuquerque
W WYCAL
K Kern River
M Mojave
D El Dorado
P El Paso*
N Northwest*
T Transwestern*
* Existing systems to be looped with varying distances
Refer to Vol. IV for specific locations

LOCATION OF THE MOJAVE, EL DORADO,
KERN RIVER, WYCAL, NORTHWEST, TRANSWESTERN,
AND EL PASO NATURAL GAS PIPELINE PROJECTS

California (FEIR/S, I/4.2). [1] The route would encompass approximately 1,006 miles of pipeline construction.

The project would consist of a northern leg and a western leg. WyCal's northern leg would consist of 40 miles of 20- and 24-inch O.D. pipeline (its Hams Fork Supply Lateral) and 567 miles of 30-inch O.D. pipeline. Except for the northernmost 55 miles, this route is the same routing as was discussed for the Kern River project and the East Las Vegas System Alternative in the FEIR/S. WyCal's western leg consists of 231 miles of 36-inch O.D. pipeline, between the junction with the northern leg (Piute Junction) and the Bakersfield area; this route is essentially the same as the Mojave project discussed in the FEIR/S up to the point where Mojave's Kern Lateral separated from the mainline. At this point, the WyCal project separates into the 63 mile long, 30-inch O.D. pipeline called the Taft Lateral and the 44 mile, 26-inch O.D. pipeline called the Kern Lateral. Again these routes have been previously analyzed in the FEIR/S.

WyCal also proposes to construct two supply laterals which begin in Mohave County in Arizona. The Topock Supply Lateral would consist of 32 miles of 24-inch O.D. pipeline. This lateral would extend from Topock, Arizona to Piute Junction, California. The Transwestern Supply Lateral would be 17 miles of 16-inch O.D. pipeline extending from Transwestern Pipeline Company's existing 30-inch O.D. pipeline. Both supply laterals follow routes identical to that proposed by Mojave as analyzed in the FEIR/S.

WyCal's proposed system would require four new compressor stations, three on its northern leg mainline and one at the junction of the Transwestern and Topock Supply Laterals. Four new metering stations and an undetermined number of delivery sales meter stations have also been proposed.

Six pipeline routing variations were considered in detail. Of these, three have been recommended by staff. The Wasatch Variation avoids crossing approximately 100 miles of rugged mountainous terrain which would be traversed by the proposed route. It also avoids crossing the Uinta National Forest. The variation diverges from the proposed route at approximately milepost (MP) 83 and rejoins it at MP 214. Use of the Wasatch Variation would add approximately 23 miles to the overall length of the route.

The second variation recommended by staff, the North Las Vegas Variation, was developed as an alternative to crossing Rainbow Gardens, Las Vegas Wash, the Sunrise Mountain Natural Area and the southern Las Vegas Valley in general. The variation would begin at MP 450 and would rejoin the proposed route at MP 568.

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[1] References to specific sections of the FEIR/S will be abbreviated. For example, the first citation above would refer to Section 4.2 of Volume II of the FEIR/S.

This variation utilizing the Goodsprings Spur would require 151 miles of pipeline compared to the 118 miles for the corresponding segment of the proposed route. Utilization of the North Las Vegas Variation would require relocation of a compressor station but no changes in compression would be necessary.

The third variation would be use of Mojave's Alternative B, which would place WyCal's Western Leg within BLM utility corridors throughout the Mojave Desert. All three of these variations have been previously examined in the FEIR/S, with the exception of 41 miles of the North Las Vegas variation which would be required to get WyCal back to its mainline section.

The WyCal pipeline would receive gas supplies from both El Paso Natural Gas Company (El Paso) and Transwestern Pipeline Company (Transwestern) in Mohave County, Arizona. El Paso proposes to loop two segments of its existing line in Apache and Navajo Counties, Arizona. The proposed case would involve 14.8 miles of 30-inch O.D. pipe and would deliver 200 MMcfd of gas to the WyCal pipeline. WyCal also proposes to accept 50 MMcfd from Transwestern at the Transwestern Supply Lateral. No additional facilities would be required on the Transwestern system.

S.1.2 The Mojave and El Dorado Systems

The proposed Mojave and El Dorado Interstate Transmission Company (El Dorado) systems have been previously discussed in the FEIR/S, I/S.1.1.

S.1.3 The Kern River System

The Proposed Kern River system has been previously discussed in the FEIR/S, I/S.1.2.

S.1.4 The "No Action" Alternative

The "No Action" alternative has two general scenarios which have been previously discussed in the FEIR/S, I/S.1.3.

S.1.5 Alternatives Eliminated

Two additional alternatives were considered but eliminated from detailed analyses. These alternatives were eliminated from detailed analyses because of economic, feasibility, and/or environmental constraints. See Section 2.6 of this Supplement.

S.2 AREAS OF CONCERN

Areas of concern involve impacts resulting from construction and operation of the pipelines at several locations along the proposed routes. These locations are generally the same as were discussed for both Mojave and Kern River since the WyCal route closely follows the proposed pipelines. A detailed discussion of these areas of concern are presented in FEIR/S, I/S.2.

S.3 MAJOR IMPACT CONCLUSIONS

Significant impacts have been analyzed in detail in the FEIR/S, I/4 and II/4 and in Section 4 of the Supplement to the FEIR/S, and mitigation measures have been developed. Table S-1 presents data relevant to impacts that would result from implementation of staff's preferred routing of the three proposals and the El Dorado Alternative. Tables S-2 through S-8 include the planned and additional mitigation measures presented in the FEIR/S. These summary tables also indicate whether the impact would still be significant after implementation of the mitigation measures.

S.4 ENVIRONMENTAL STAFF CONCLUSIONS

Because the Integrated Intrastate System Alternative and the Northwest/PGT/Integrated Intrastate System Alternative involve minimal or no construction of new facilities, they would be far superior to any of the interstate systems discussed above. However, use of intrastate systems may not meet one of the main goals of the project, i.e., supplying a firm supply of gas to the EOR market. Resolution of this issue is beyond the scope of the FEIR/S, but will be given full consideration in the certification process before the FERC.

If use of the intrastate systems is determined to be unacceptable and there is a project need, one of the projects would be constructed. Information provided by the applicants and further developed by the environmental staff indicates that construction and operation of any of the proposed interstate natural gas pipeline projects would have limited, although in some cases significant, adverse environmental impact. Three environmentally superior configurations of the proposed interstate systems were developed. The Mojave proposal or El Dorado alternative utilizing the El Paso 600 MMcfd and Northwest 100 MMcfd Expansions would represent the best Mojave or El Dorado systems from an environmental perspective. The Kern River system utilizing both the Wasatch and North Las Vegas Variations would be the environmentally superior Kern River route. The WyCal system utilizing the Wasatch and North Las Vegas Variations and the Mojave Alternative B would be the environmentally superior WyCal route.

Table S-1

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C[1] with Alternative B	Proposed El Dorado System A	Preferable El Dorado[2] System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
AIR QUALITY	NSI[3]	NSI	NSI	NSI	NSI	NSI	NSI	NSI
GEOLOGY								
Surface fault rupture	18	16	18	16	23	23	35	36
Miles of landslide potential	27	80	27	80	163	136	149	122
Miles of slope greater than 30%	69	45	82	57	229	215	214	204
SOIL								
Acres of poor reclamation potential	4768	3483	4343	3052	4882	4324	6176	5969
SURFACE WATER								
Number of stream crossings	74	68	68	61	135	138	161	172
Intermittent stream crossings	71	65	65	58	83	102	96	122
Perennial stream crossings	3	3	3	3	52	36	54	38
Moderate/high significance perennial stream crossings	0	0	0	0	39	27	45	33
GROUNDWATER								
Miles of potential impact	30	17	15	7	10	11	30	26
FRESHWATER BIOLOGY								
Number of sensitive stream crossings with fish present	0	0	0	0	13	7	17	9
TERRESTRIAL BIOLOGY								
Vegetation								
Total acres of native vegetation temporarily disturbed	8465	6561	8549	6697	8646	8736	10917	11270

Table S-1 (continued)

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C 1/ with Alternative B	Proposed El Dorado System A	Preferable El Dorado 2/ System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
Vegetation (continued)								
Acres of woody vegetation kept cleared for the life of the project	1765	1774	1838	1797	2920	3028	3858	4353
Acres of riparian habitat crossed	61	60	24	24	98	148	183	254
Acres of federally threatened or endangered plant habitat affected	60	0	60	0	0	0	0	0
Number of species	1	0	1	0	0	0	0	0
Acres of California classified plant habitat affected	947	947	947	947	536	536	947	947
Number of species	3	3	3	3	4	4	3	3
Acres of agricultural land temporarily disturbed	767	731	525	489	1561	1846	1288	1550
Wildlife								
Big game crucial or high priority habitat (acres)	748	564	748	564	1350	1155	1423	1283
Big game migration corridors (acres)	121	121	121	121	162	48	211	134
Big game fawning/calving areas (acres)	56	0	56	0	0	0	0	0
Upland game bird sensitive habitat (acres)	0	24	0	24	404	428	335	359
Critical waterfowl nesting areas (acres)	0	0	0	0	60	46	60	46
Raptor nesting areas (nests)	0	0	0	0	12	15	18	21
Acres of potential threatened or endangered animal habitat affected	9615	9467	8819	8799	8404	8341	9283	9922

Table S-1 (continued)

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C 1/ with Alternative B	Proposed El Dorado System A	Preferable El Dorado 2/ System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
Wildlife (continued)								
Yuma clapper rail	151	36	97	36	0	0	127	127
Bald eagle	187	72	169	115	121	168	284	331
Peregrine falcon	490	60	490	121	0	120	163	283
Whooping crane	0	0	0	0	0	0	0	0
California condor	1355	1355	1492	1492	1560	1560	1355	1355
Blunt nosed leopard lizard	517	517	388	388	339	339	517	517
Tehachapi slender salamander	18	18	0	0	3	3	18	18
Desert tortoise	3032	3274	2756	2998	3716	3837	3659	4083
San Joaquin kit fox	647	647	410	410	333	333	647	647
Black-footed ferret	1345	1567	1345	1567	600	600	640	640
Utah prairie dog	0	0	0	0	0	0	0	0
Mohave ground squirrel	727	775	667	667	751	751	727	775
Nelson's antelope squirrel	412	412	412	412	290	290	412	412
Tipton kangaroo rat	24	24	24	24	24	24	24	24
Short-nosed kangaroo rat	410	410	436	436	290	290	410	410
Giant kangaroo rat	300	300	133	133	177	177	300	300
SOCIOECONOMICS								
Population change >10%	No	No	No	No	No	No	No	No
Total employment change >10%	No	No	No	No	No	No	No	No

Table S-1 (continued)

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C 1/ with Alternative B	Proposed El Dorado System A	Preferable El Dorado 2/ System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
SOCIOECONOMICS								
Income change >10%	No	No	No	No	No	No	No	No
Vacancy rates of temporary housing <5%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local tax base change >10%	5 counties	1 county	5 counties	1 county	7 counties	6 counties	7 counties	6 counties
Traffic	NSI	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Operational Noise	NSI	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Recreation (conflicts)	5	4	3	2	6	4	8	8
LAND USE/OWNERSHIP conflicts	9	5	6	3	5	2	13	9
CULTURAL RESOURCES Number of sites in the direct impact zone	82	88	86	95	77	81	109	106
NRHP listed or eligible sites in the direct impact zone	2	2	2	2	4	4	6	6
Percentage of line actually surveyed or survey coverage within analysis corridor	6	12	12	15	5	6	6	10
High sensitivity segments	8	9	9	9	9	9	8	8
PALEONTOLOGY Acres of impact to significant formations	3205	2571	2935	2454	6119	7240	6458	7670
VISUAL RESOURCES Acres of high visual impact	0	0	318	318	470	236	263	29

1/ Mojave System C = Mojave/El Paso (100/500)/Northwest (100)
2/ Alternative B keeps Mojave within the desert corridor near Barstow, California
El Dorado System C = El Dorado/El Paso (100/500)/Northwest (100)
3/ NSI = No Significant Impacts

Table S-2

SIGNIFICANT ADVERSE IMPACTS FOR THE MOJAVE PROPOSAL

Discipline	Significant Impact	Mitigation[1] Measures	Effectiveness	Residual Significant Impact
GEOLOGY				
Construction and operation	Slope stability in the Tehachapi Mountains potential landslides	5, 6, 11, and 13	Implementation of appropriate controls would resolve significant impacts	No
	Subsidence: hydrocompaction potential is significant between MP 290-312 and 260-270	10, 14	Reduce potential to cause hydrocompaction to minimal levels	No
	Potential ground rupture at fault crossings including Garlock, White Wolf, and Edison	5, 6, and 13	Ground motion parameters developed will be used in seismic design of the pipeline and ancillary structures	No
SOILS				
Construction and operation	Probability of significant wind erosion is high on the Mojave Transfer Line and on the Main line between MP 0-128.5, 166-176	16, 17, 18, 19, 21, 24, 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, 37, and 38	Probability of successful revegetation will be improved on affected soils	Yes
	Probability for significant water erosion is high on mainline between MP 153-154, 228-256, 312-316	16, 17, 18, 19, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, and 38	Water erosion potential will be decreased and probability of successful revegetation will be improved	Yes
SURFACE WATER				
Construction and operation	Probability of significant intensive surface runoff increasing sediment load and decreasing water quality in the Tehachapi Mountains, Kern River, and Poso Creek	39, 40, 42, 43, 44, 45, 50, 51, 52, 57, and 58	Reclamation potential of some soils on steep slopes may be so poor that stabilization may take 5 to 10 years	No
	Possibility of significant impact caused by hydrostatic test water withdrawal and discharge	48, 49, 53, 54, 55, and 56	Minimize scouring and reduce increased sedimentation to streams, minimize downstream impact on water availability	No
GROUNDWATER				
Construction and operation	Possibility of significant impacts to ground water caused by contamination due to fuel or chemical spills around MP 200	56 and 59	Reduce potential for spills and avoid shallow ground water areas	No
	Possible adverse impact on springs	60	Damage to important springs due to and grading would be minimized	No
FRESHWATER BIOLOGY				
Construction and operation	Increased turbidity and sedimentation of aquatic habitat	63, 64, and 65	Reduce instream disturbance and restore disturbed banks stream banks	No

Table S-2 (continued)

SIGNIFICANT ADVERSE IMPACTS FOR THE MOJAVE PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
TERRESTRIAL BIOLOGY Construction and operation	Loss of wetland and riparian vegetation would occur primarily along the northern end of the Kern River Lateral	66, 67, 68, 71, 83, 84, and 85	Successful implementation would greatly reduce magnitude of impacts	No
	Loss of oak-pine woodland habitat would occur in the Tehachapi Mountains. Loss of plant species of special concern.	67, 68, 71, 73, 82, 84, and 85	Realignment of the proposed route to avoid populations or habitats of plant species would be most effective method of reducing impacts	No
	Loss of wildlife species of special concern including threatened or endangered species and associated habitats	86, 90, 91, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 111, 112, 113, 114, and 115	Reduce stress on animals and destruction of habitat associated with use of ORV's, identification of construction periods to coincidence with wildlife requirements would reduce stress, habitat identification could be possible mitigation to reduce impacts	Yes
	Loss of individual desert tortoise and their habitat	89, 96, 97, 110, 111, and 113	Reduce impacts to individuals and habitats	No
LAND USE/OWNERSHIP Construction and operation	Land use/ownership conflicts	130, 145, 146, and 147	Reduce impacts to individuals and and reduce land use/ownership conflicts	Yes
CULTURAL RESOURCES Construction and operation	Potential loss of significant cultural resources and the research potential which could be permanently destroyed	133 and 137	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
PALEONTOLOGICAL RESOURCES Construction and operation	Potential loss of significant fossil finds and reduction of significant fossiliferous formations. This would result in a permanent loss of the resource.	139	Reduce impacts by monitoring would allow some knowledge on the formation which would allow assessment of the formation for future research	No
VISUAL RESOURCES Construction and operation	Loss of visual environment and degradation of established VRM class could occur	140, 141, and 142	Reduce impacts to the visual environment to acceptable levels by following contours, revegetating, etc.	No

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1/ Numbers refer to mitigation measures listed in FEIR/S, I/4.

Table S-3

SIGNIFICANT ADVERSE IMPACTS FOR THE EL DORADO ALTERNATIVE

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
GEOLOGY				
Construction and operation	Slope stability in the Tehachapi Mountains, potential landslides	7, 8, 9, 13, 14, and 12	Implementation of appropriate controls would resolve significant impacts	No
	Subsidence: hydrocompaction potential is significant between MP 290-310 and 256-268	13 and 14	Reduce potential to cause hydrocompaction to minimal levels	No
	Potential ground rupture at fault crossings including Garlock, White Wolf, and Edison	13	Ground motion parameters developed will be used in seismic design of the pipeline and ancillary structures	No
SOILS				
Construction and operation	Probability of significant wind erosion is high on the North Receipt Lateral and on the Main line between MPO-180	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, 37, and 38	Probability of successful revegetion will be improved on affected soils	Yes
	Probability for significant water erosion is high on mainline between MP 146-147, 240-254, 305-310	16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, and 38	Water erosion potential will be decreased and probability of successful revegetation will be improved	Yes
SURFACE WATER				
Construction and operation	Probability of significant intensive surface runoff increasing sediment load and decreasing water quality in the Tehachapi Mountains, Kern River, and Poso Creek	41, 42, 43, 50, 51, 52, 57, and 58	Reclamation potential of some soils on steep slopes may be so poor that stabilization may take 5 to 10 years	No
	Possibility of significant impact caused by hydrostatic test water withdrawal and discharge	48, 49, 53, 54, 55, and 56	Minimize scouring and reduce increased sedimentation to streams, minimize downstream impact on water availability	No
GROUNDWATER				
Construction and operation	Possibility of significant impacts to ground water caused by contamination due to fuel or chemical spills	56 and 59	Reduce potential for spills and avoid shallow ground water areas	No
	Possible adverse impact on springs	60	Damage to important springs due blasting and grading would be minimized	No
FRESHWATER BIOLOGY				
Construction and operation	Increased turbidity and sedimentation of aquatic habitat	61, 62, 63, 64, and 65	Reduce instream disturbance and restore disturbed stream banks	No

Table S-3 (continued)

SIGNIFICANT ADVERSE IMPACTS FOR THE EL DORADO ALTERNATIVE

Discipline	Significant Impact	Mitigation [1] Measures	Effectiveness	Residual Significant Impact
TERRESTRIAL BIOLOGY Construction and operation	Loss of wetland and riparian vegetation would occur primarily along the northern end of the East Delivery Lateral	66, 67, 68, 71, 83, 84, and 85	Successful implementation would greatly reduce magnitude of impacts	No
	Loss of oak-pine woodland habitat would occur in the Tehachapi Mountains. Loss of plant species of special concern.	67, 68, 71, 73, 82, 84, and 85	Realignment of the proposed route to avoid populations or habitats of plant species would be most effective method of reducing impacts	No
	Loss of wildlife species of special concern including threatened or endangered species and associated habitats	86, 91, 92, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 111, 112, 113, 114, and 115	Reduce stress on animals and destruction of habitat associated with use of ORV's, identification of construction periods to coincidence with wildlife requirements would reduce stress, habitat identification could be possible mitigation to reduce impacts	Yes
	Loss of individual desert tortoise and their habitat	92, 96, 97, 110, 111, and 113	Reduce impacts to individuals and habitats	No
LAND USE/OWNERSHIP Construction and operation	Land use/ownership conflicts	130 and 153	Reduce impacts to individuals and reduce land use/ownership conflicts	Yes
CULTURAL RESOURCES Construction and operation	Potential loss of significant cultural resources and the research potential which could be permanently destroyed	134 and 137	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
PALEONTOLOGICAL RESOURCES Construction and operation	Potential loss of significant fossil finds and reduction of significant fossiliferous formations. This would result in a permanent loss of the resource.	139	Reduce impacts by monitoring. Would allow some knowledge on the formation which would allow assessment of the formation for future research	No
VISUAL RESOURCES Construction and operation	Loss of visual environment and degradation of established VRM class could occur	140, 141, and 142	Reduce impacts to the visual environment to acceptable levels by following contours, revegetating, etc.	No

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[1] Numbers refer to mitigation measures listed in FEIR/S, I/4.

Table S-4

SIGNIFICANT ADVERSE IMPACTS FOR THE EL PASO PROPOSAL

Discipline	Significant Impact	Mitigation [1] Measures	Effectiveness	Residual Significant Impact
GEOLOGY				
Construction and operation	Possibility of significant slope instability along the Window Rock, Leupp and Williams Loops (Base Case and Alternatives)	13 and 14	Implementation of appropriate controls would resolve significant impact	No
SOILS				
Construction and operation	Reclamation potential would be poor on nearly one-half of total construction mileage (Base Case and Alternatives)	16, 17, 18, 19, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, and 38	The probability of successful reclamation would substantially increase	Yes
TERRESTRIAL BIOLOGY				
Construction and operation	Loss of approximately 0.8 acres of wetland and riparian vegetation would occur along portions of the loops (Alternatives)	67, 68, 71, 83, 84, and 85	Successful implementation would greatly reduce the magnitude and duration of impacts	No
	Loss of individuals and habitat of plant species of special concern would potentially occur along 7 of the loops (Base Case and Alternatives)	67, 68, 69, 70, 71, 84, and 85	Realignment would effectively reduce impacts by avoiding populations of sensitive species and their habitats	No
	Impacts of the Ferruginous and Swainson's hawk, Mountain plover, desert tortoise and gila monster (all species of special concern) and their habitat could potentially occur along a number of loops Ferruginous and Swainson's hawk, and Mountain Plover (Base Case and Alternative); Desert Tortoise and Gila monster (Alternatives only)	86, 96, 97, 98, 99, 100, 101, 103, 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, and 115	Reduction of stress on sensitive species during critical time periods would minimize overall impacts on the population, as would restricting access	No
LAND USE/OWNERSHIP				
Construction and operation	Land use/ownership conflict (Alternative)	129, 130, 131, 132, and 157	Eliminate crossing the Elden Environmental Study Area	No

Table S-4 (continued)

SIGNIFICANT ADVERSE IMPACTS FOR THE EL PASO PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
CULTURAL RESOURCES				
Construction and operation	Potential loss of significant cultural resources and the research potential which could be permanently destroyed (Base Case and Alternatives)	135 and 137	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
	Impacts to American Indian concerns such as sacred areas and burials Base Case and Alternative)	138 and 158	Information from American Indians should resolve these problems	No
PALEONTOLOGICAL RESOURCES				
Construction and operation	Potential loss of significant fossil finds, localities or formations could result in a permanent loss of the resource (Base Case and Alternative)	139	Reduction of impacts by monitoring would provide some knowledge on the formations allowing future research in adjacent areas	No
VISUAL RESOURCES				
Construction and operation	Loss of significant visual visual environment and degradation of VRM or VQO class could occur (Alternatives)	140, 141, and 142	Reduction of visual impacts to acceptable level is possible	No

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1/ Numbers refer to mitigation measures listed in FEIR/S, I/4.

Table S-5

SIGNIFICANT ADVERSE IMPACTS FOR THE NORTHWEST EXPANSION PROJECT

Discipline	Significant Impact	Mitigation[1] Measures	Effectiveness	Residual Significant Impact
GEOLOGY Construction and operation	Rangely A & B Loops are in areas with significant slope stability problems	13 and 14	Inplementation of appropriate controls could resolve significant impact	No
	Rangely A & B Loops are in areas with significant potential to be impacted by flooding and debris flows	14	Reduce damage potential from flooding and debris flows	No
SOILS Construction and operation	The potential for significant water erosion is high on some portions of the Cisco Loop. Reclamation potential would be poor on the Muddy Creek, Cisco and Moab Loops	16, 18, 19, 21, 24, 25, 26, 27, 28, 28, 30, 31, 32, 33, 34, 35, 36, 37, and 38	The probability of successful reclamation would be considerably increased	Yes
SURFACE WATER Construction and operation	High potential for increase in sediment loading to Douglas Creek along Rangely Loop A and to East Salt Creek along Rangely Loop B	42, 43, 50, 51, 52, 57, and 58	Measures would reduce the amounts of sediment available for entry into the streams and restrict its transport	No
FRESHWATER BIOLOGY Construction and operation	Increased turbidity and sedimentation of aquatic habitat	63, 64, and 65	Reduce instream disturbance and restore disturbed stream beds	No
TERRESTRIAL BIOLOGY Construction and operation	Loss of over 5 acres of wetland and riparian vegetation would occur along portions of the Muddy Creek, Rangely A, Rangely B, Cisco, Moab and Cahone Loops	67, 68, 71, 83, 84, and 85	Successful implementation would greatly reduce the magnitude and duration of impacts.	No
	Loss of plant species of special concern (threatened or endangered) and habitat could occur along portions of the Rangely B, Cisco, Moab and Cahone Loops	67, 68, 71, 84, 85, and 160	Impacts would be reduced if sensitive species or habitats could be avoided. Limiting access would minimize additional disturbance.	No
	Loss of wildlife species of special concern and associated habitats could occur along all the loops	86, 96, 97, 98, 99 100, 101, 103, 104, 105, 106, 107, 109, 111, 112, 113, 114, and 115	Stress on sensitive species during critical periods would be reduced and impacts minimized. Restricting access would also reduce stress.	No

Table S-5 (continued)

SIGNIFICANT ADVERSE IMPACTS FOR THE NORTHWEST EXPANSION PROJECT

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
TERRESTRIAL BIOLOGY (continued)				
	Disturbance of golden eagle, prairie falcon and burrowing owl nesting sites along the loops could be significant	86, 98, 99, 103, 104, 105, 112, 113, and 114	Stress on sensitive species during critical periods would be reduced and impacts minimized. Restricting access would also reduce stress.	No
	Disturbance of an active sage grouse lek along the Muddy Creek Loop is significant	96, 99, 100, 101, 103, 104 105, 112, 113, and 114	Stress on sensitive species during critical periods would be reduced and impacts minimized. Restricting access would also reduce stress.	No
	Disturbance of pronghorn or critical winter range is significant along the Muddy Creek Loop	96, 99, 100, 101, and 114	Stress on sensitive species during critical periods would be reduced and impacts minimized. Restricting access would also reduce stress.	No
	Potential for black-footed ferret along the Muddy Creek, Green River, Cisco, Moab and Cahone Loops exists	99, 100, 101, 103, 104, 105, 112, 113, 114, 161, and 162	Stress on sensitive species during critical periods would be reduced and impacts minimized. Restricting access would also reduce stress.	No
	Disturbance of an active peregrine falcon aeyrie near the Moab Loop would be significant	86, 98, 99, 103, 104, 105, 112, 113, and 114	Stress on sensitive species during critical periods would be reduced and impacts minimized. Restricting access would also reduce stress.	No
LAND USE	Significant impacts to existing ROW users could occur along Rangely Loop A	129, 130, 131, and 132	Consultation with appropriate ROW users should resolve any conflicts	No
CULTURAL RESOURCES Construction and operation	Potential loss of significant cultural resources and research potential which could be permanently destroyed	137	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
	Impacts to American Indian concerns such as sacred areas and burials	138	Information from American Indians should resolve these problems	No
PALEONTOLOGICAL RESOURCES Construction and operation	Potential loss of significant fossil finds, localities or formations could result in a permanent loss of the resource	139	Reduction of impacts by monitoring would provide some knowledge on the formations allowing future research in adjacent areas	No
VISUAL RESOURCES Construction and operation	Loss of visual environment and degradation of VRM or VQO class could occur	140, 141, and 142	Reduction of visual impacts to acceptable levels is possible	No

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1/ Numbers refer to mitigation measures listed in FEIR/S, I/4.

Table S-6

SIGNIFICANT ADVERSE IMPACTS FOR THE TRANSWESTERN EXPANSION PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
GEOLOGY Construction and operation	Potential of significant slope instability along portions of some of the loops	6, 7, 13, and 14	Implementation of appropriate controls would resolve significant impact	No
	Probability of significant impacts caused by subsidence along Loops A and E	10 and 14	Reduce hydrocompaction potential to minimal levels	No
	Potential ground rupture at fault crossing in western Rio Grande Rift Valley	5, 6, and 13	Ground motion parameter would be developed and used in seismic design of the pipeline	No
SOILS Construction and operation	Reclamation potential would be poor on one-half of total construction mileage	16, 17, 18, 19, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, and 38	The probability of successful reclamation would be substantially increased	Yes
FRESHWATER BIOLOGY Construction and operation	Increased turbidity and sedimentation of aquatic habitat	63, 64, and 65	Reduce instream disturbance and restore disturbed stream beds	No
TERRESTRIAL BIOLOGY Construction and operation	Loss of wetland and riparian vegetation would occur along portions of some of the loops	66, 67, 68, 71, 83, 84, and 85	Successful implementation would greatly reduce the magnitude and duration of impacts	No
	Loss of sensitive plant species habitat could occur along portions of the loops	67, 68, 71, 84, and 85	Successful implementation would would effectively reduce impacts by avoiding populations of sensitive species	No
	Loss of endangered and threatened wildlife species and habitat could occur on portions of some of the loops	86, 87, 93, 94, 95, 96, 97, 98, 99, 100, 101, 103, 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, 115, 167, 168, and 169	Reduction of stress on sensitive species during critical time periods would minimize overall impacts on the population, as would restricting access	No

Table S-6 (continued)

SIGNIFICANT ADVERSE IMPACTS FOR THE TRANSWESTERN EXPANSION PROPOSAL

Discipline	Significant Impact	Mitigation Measures [1]	Effectiveness	Residual Significant Impact
LAND USE/OWNERSHIP Construction and operation	Land use/ownership conflict	129, 130, 131, 132, 170, 171, and 172	Would eliminate all conflicts	No
CULTURAL RESOURCES Construction and operation	Potential loss of significant cultural resource data could occur causing a loss of scientific knowledge	136 and 137	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
	Impacts to American Indian concerns such as sacred areas and burials	138 and 173	Information from American Indians should resolve these problems	No
PALEONTOLOGICAL RESOURCES Construction and operation	Potential loss of significant fossil finds, localities or formations would result in a permanent loss of the resource	139	Reduction of impacts by monitoring would provide some knowledge on the formations allowing future research in adjacent areas	No
VISUAL RESOURCES Construction and operation	Loss of visual environment and degradation of VRM or VQO class could occur	140, 141, and 142	Reduction of visual impacts to acceptable level is possible	No

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[1] Numbers refer to mitigation measures listed in FEIR/S, I/4.

Table S-7

SIGNIFICANT ADVERSE IMPACTS FOR THE KERN RIVER PROPOSAL

Discipline	Significant Impact	Mitigation [1/] Measures	Effectiveness	Residual Significant Impact
GEOLOGY				
Construction and operation	Significant impact caused by slope instability and avalanche could occur in Wasatch Mountain portion of mainline and the Tehachapi Mountains	5, 6, 8, 10, 11, 12, 14, 15, and 16	Implementation of appropriate controls would minimize significant impact	Yes
	Significant impact caused by hydrocompaction could occur in the Mettler area and within the San Joaquin Valley	7	Reduce hydrocompaction potential to minimal levels	No
	Potential ground rupture at fault crossings including Wasatch, Garlock and White Wolf	5, 6, 10, 11, and 13	Ground motion parameters will be developed and used in seismic design of the pipeline and ancillary facilities	No
SOILS				
Construction and operation	Significant water erosion of soils could occur along portions of the route between Wyoming and California. Highest potential would occur in areas traversing mountains or steep hills	18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 37, 39, 40, 41, 42, 43, 44, and 45	Water erosion potential will be decreased and probability for successful revegetation will be improved	Yes
	Significant wind erosion of to soils could occur along all portions of the route particularly in the Mojave Desert	18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 31, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, and 45	Probability for successful reclamation will be increased	Yes
SURFACE WATER				
Construction and operation	Significant impacts caused by hydrostatic test water discharge could occur	54, 55, 56, 57, 66, 67, 68, and 69	Scouring would be minimized at discharge site. Sedimentation to streams would be decreased	No
	Significant impacts caused by increased sediment loading could occur particularly in steep terrain in the Wasatch and Tehachapi Mountains	46, 47, 48, 49, 50, 51, 52, 53, 58, 59, 60, 61, 62, 63, 64, and 65	Impacts could be reduced, but steep slopes would remain as severe reclamation problem areas and some sedimentation would still occur	Yes
GROUND WATER				
Construction and operation	Possibility of significant impacts to groundwater caused by contamination due to fuel or chemical spills in shallow groundwater areas	70	Reduce potential for spills and avoid shallow groundwater areas	No
	Possible adverse impact on springs	71	Damage to important springs due to blasting and grading would be minimized	No

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[1/] Numbers refer to mitigation measures listed in FEIR/S, II/4.

Table S-7 (continued)

SIGNIFICANT ADVERSE IMPACTS FOR THE KERN RIVER PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
FRESH WATER BIOLOGY Construction and operation	Potential significant impacts could occur from construction activities at 13 stream crossings in the Middle Rocky Mountains region, particularly the Provo River and Beaver Creek which cross habitats of sensitive species	72, 73, 74, and 75 in addition to measures outlined for surface water	Impacts could be reduced, but steep slopes would remain as severe reclamation problem areas and some sedimentation would still occur	Yes
TERRESTRIAL BIOLOGY Construction and operation	Loss of wetland and riparian zone vegetation would occur along portions of the entire route particularly the Strawberry, Bear and Weber Rivers in Utah and Las Vegas Wash in Nevada	74, 76, 78, 79, 82, 85, 86, and 87	Successful reclamation would greatly reduce the magnitude of impacts.	No
	Loss of plant species of special concern and habitat could occur along the entire route, particularly in the Basin and Range, Mojave Desert, and San Joaquin Valley Regions	77, 78, 79, 83, 84, 86, and 87	Realignment to avoid problem areas in the only way to effectively minimize impacts. Restricted access would enhance the probability of successful reclamation	No
	Loss of wildlife species of special concern and habitat could occur along portions of the entire route particularly affecting species in the Wyoming Basin, the Mojave Desert, and the San Joaquin Valley	88, 89, 90, 91, 92, 93, 94, 95, 96, 98, 99, 100, 101, 102, 103, 104, 105, 107, 108, 109, 110, 111, 112, 113, 114, and 115	Reduction of stress and impacts during critical time periods would minimize overall effects on the populations. Immediate revegetation replaces lost habitat with less impact on species. Field surveys define areas to avoid and/or regulate timing of activities.	Yes
LAND USE/OWNERSHIP Construction and operation	Land use/ownership conflicts	15, 129, 130, 131, 132, and 133	Reduce land use/ownership conflicts	Yes
CULTURAL RESOURCES Construction and operation	Potential loss of significant cultural resources and the research potential which could be permanently destroyed	134, 135, and 136	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
PALEONTOLOGICAL RESOURCES Construction and operation	Potential loss of significant fossil finds and reduction of significant fossiliferous formations. Result in a permanent loss of the resource.	137	Reduce impacts by monitoring would allow some knowledge on the formation which would allow assessment of the formation for future research	No
VISUAL RESOURCES Construction and operation	Loss of visual environment and degradation of established VRM or VQO class could occur.	138, 139, and 140	Reduce impacts to the visual environment to acceptable levels by following contours, revegetating, etc.	Yes

Table S-8

SIGNIFICANT ADVERSE IMPACTS, WYCAL PIPELINE PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
GEOLOGY Construction and operation	Significant impact caused by slope instability and avalanche could occur in Wasatch Mountain portion of mainline and the Tehachapi Mountains	4, 5, 7, 8, 9, 10, 11, 12, 155, 156, and 157	Implementation of appropriate controls would minimize significant impact	Yes
	Significant impact caused by hydrocompaction could occur in the Mettler area and within the San Joaquin Valley	6	Reduce hydrocompaction potential to minimal levels	No
	Potential ground rupture at fault crossings including Wasatch, Garlock White Wolf and Edison	4, 5, 8, 9, and 11	Ground motion parameters will be developed and used in seismic design of the pipeline and ancillary facilities	No
SOILS Construction and operation	Significant water erosion of soils could occur along portions of the route between Wyoming and California. Highest potential would occur in areas traversing mountains or steep hills	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34	Water erosion potential will be decreased and probability for successful revegetation will be improved	Yes
	Significant wind erosion of to soils could occur along all portions of the route particularly in the Mojave Desert	13, 15, 17, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, and 34	Probability for successful reclamation will be increased	Yes
SURFACE WATER Construction and operation	Probability of significant surface runoff increasing sediment load and decreasing water quality particulary in the steep terrain of the Wasatch and Tehachapi Mountains, Kern River, and Poso Creek	35, 36, 37, 38, 44, 45, 46, 47, 48, 49, 50, 51, 158, and 159	Reclamation potential of some soils on steep slopes may be so poor that stabilization may take 5 to 10 years	Yes
	Possibility of significant impact caused by hydrostatic test water withdrawal and discharge	39, 40, 41, 42, and 43	Minimize scouring and reduce increased sedimentation to streams, minimize downstream impact on water availability	No

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1/ Numbers refer to mitigation measures listed in Section 3.1 of Volume III.

Table S-8 (continued)

SIGNIFICANT ADVERSE IMPACTS, WYCAL PIPELINE PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
GROUNDWATER Construction and operation	Possibility of significant impacts to ground water caused by contamination due to fuel or chemical spills in shallow groundwater areas	49, 52	Reduce potential for spills and avoid shallow ground water areas	No
	Possible adverse impact on springs	53	Damage to important springs due to grading would be minimized	No
FRESHWATER BIOLOGY Construction and operation	Potential significant impacts could occur from construction activities at 17 stream crossings in the Middle Rocky Mountains region, particularly the Provo River and Beaver Creek which cross habitats of sensitive species	54, 55, 56, and 160, in addition to measures outlined for surface water	Impacts could be reduced, but steep slopes would remain as severe reclamation problem areas and some sedimentation would still occur	Yes
TERRESTRIAL BIOLOGY Construction and operation	Loss of wetland and riparian vegetation would occur portions of the entire route particularly along the Strawberry, Bear and Weber Rivers in Utah, the Las Vegas Wash in Nevada, and the Kern River along the Kern Lateral	56, 57, 58, 59, 60, 61, 62, 64, 69, 70, and 71	Successful implementation would greatly reduce magnitude of impacts	No
	Loss of plant species of special concern and habitat could occur along the entire route, particularly in the Basin and Range, Mojave Desert, and San Joaquin Valley Regions	57, 58, 61, 63, 69, 70, 72, 73, 74, and 161	Realignment to avoid problem areas in the only way to effectively minimize impacts. Restricted access would enhance the probability of successful reclamation	No
	Loss of wildlife species of special concern and habitat could occur along portions of the entire route particularly affecting species in the Wyoming Basin, the Mojave Desert, and the San Joaquin Valley	75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 86, 87 88, 89, 90, 91, 162, 163, and 164	Reduction of stress and impacts during critical time periods would minimize overall effects on the populations. Immediate revegetation replaces lost habitat with less impact on species. Field surveys define areas to avoid and/or regulate timing of activities	Yes
	Loss of individual desert tortoise and their habitat	76, 77, 78, 80, 82, 84, 85, 86, 87, 88, 89, 90, and 91	Reduce impacts to individuals and habitats	No

Table S-8 (continued)

SIGNIFICANT ADVERSE IMPACTS, WYCAL PIPELINE PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
LAND USE/OWNERSHIP				
Construction and operation	Land use/ownership conflicts	102, 103, 104, 105, 165, 166, 167, and 168	Reduce impacts to individuals and and reduce land use/ownership conflicts	Yes
CULTURAL RESOURCES				
Construction and operation	Potential loss of significant cultural resources and the research potential which could be permanently destroyed	106 and 107	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
PALEONTOLOGICAL RESOURCES				
Construction and operation	Potential loss of significant fossil finds and reduction of significant fossiliferous formations. This would result in a permanent loss of the resource.	108	Reduce impacts by monitoring would allow some knowledge on the formation which would allow assessment of the formation for future research	No
VISUAL RESOURCES				
Construction and operation	Loss of visual environment and degradation of established VRM or VQO class could occur.	109 and 110	Reduce impacts to the visual environment to acceptable levels by following contours, revegetating, etc.	Yes

Within California, each of the project routings was compared to see if one applicant had chosen a superior location for its pipeline. Where this was the case, the FEIR/S identified this location as being the one that should be used if any of the proposals are approved.

The environmentally preferred interstate proposal is the Mojave System with the route modifications described in the FEIR/S. This conclusion is based on two major premises: (1) these systems would involve significantly less environmental impact even if built with all supply projects as proposed; and (2), the supply projects of El Paso and Transwestern could be phased to match actual market requirements as the market evolves.

The first premise results from the fact that Kern River and WyCal routes entail substantially more miles of pipeline construction and substantially more compression, cross sensitive environmental areas, cross one of those areas ~~in a location which will~~ which the Forest Service has emphasized (and the staff agrees) would be difficult ~~if not impossible~~ to construct and maintain without long-term environmental impact, and are not immediately adjacent to existing utilities to the extent the other systems are.

In the case of Mojave or El Dorado, no areas of significant construction or maintenance difficulty would be involved on the recommended routes and major portions of the routes would be immediately adjacent to existing pipeline rights-of-way. In addition, the supply lines would be entirely adjacent to existing pipelines and would share significant portions of previously disturbed ROW. Moreover, it is the staff's position that the Transwestern Expansion may be unnecessary since the El Paso system may be able to supply all of the design requirements of either Mojave or El Dorado with substantially fewer new facilities. The question of El Paso being able to supply the entire volumes is being addressed in the FERC's hearing process. Elimination of the Transwestern Expansion would make the Mojave or El Dorado systems even more environmentally attractive.

Premise number two is simply a reflection of the fact that existing systems may be expanded incrementally as the EOR/cogen market develops. Kern River must impact the environment along the entire proposed ROW regardless of the amount of gas initially or ultimately needed for the market. The environment along the El Paso and Transwestern systems involved in the proposed expansion can be impacted incrementally if the market does not materialize instantly at the level specified in the applications. Indeed, if it never attains that level, the environmental impact may be contained at a lower level.

For the WyCal proposal, the Transwestern Expansion is not necessary or proposed. The facilities associated with El Paso may or may not be necessary. On a simple comparative basis, it is clear that WyCal has more environmental impacts than each of the other proposals. Given that this proposal is the longest and therefore impacts the environment the greatest, it is staff opinion that this project be constructed in an incremental manner, dependent on gas market conditions.

1.0 INTRODUCTION

On December 18, 1987, the Federal Energy Regulatory Commission (FERC or Commission) and the California State Lands Commission (SLC) made available a joint Final Environmental Impact Report/Statement (FEIR/S) which presented an analysis pertaining to the construction, operation, and maintenance of two competing projects to supply natural gas to the Kern County, California, area to generate steam for injection in the enhanced oil recovery (EOR) and cogeneration processes. The competitors and their supporting applications before the FERC included the following:

Mojave Pipeline Company	Docket No. CP85-437-003
Kern River Gas Transmission Co.	Docket No. CP85-552-002
El Dorado Interstate Transmission Co. [1]	Docket No. CP86-205-001
Northwest Pipeline Corporation	Docket No. CP85-625-001
El Paso Natural Gas Company	Docket No. CP86-197-003
Transwestern Pipeline Company	Docket No. CP86-212-001

The first two projects, proposed by Mojave Pipeline Company (Mojave) and Kern River Gas Transmission Company (Kern River), are competing to transport natural gas from various sources outside of California to the Bakersfield, California, area. The El Dorado Interstate Transmission Company Proposal (El Dorado) was considered in the FEIR/S to be an alternative to Mojave or Kern River but not a competitor. [1] The other three companies proposed facilities to deliver gas to the competitors.

On May 19, 1986, FERC consolidated the various applications under one proceeding and set it for hearing under the lead docket of Mojave Pipeline Company, *et al*., Docket Nos. CP85-437-000, *et al*. For the next year, the applicants, the intervenors, the FERC staff, and the Administrative Law Judge (ALJ) were involved in discovery proceedings. Direct, answering, and rebuttal testimony on environmental and non-environmental issues were filed before FERC. After each phase of filing was completed the parties engaged in extensive discovery hearings. The process included discovery arguments, motions to compel discovery, oral arguments of the motions to compel, and interlocutory appeals. After a year of pretrial proceedings, the hearings began on September 9, 1987, and were divided into two phases. Phase I, which began on September 9, 1987, dealt with all issues other than the issue of adequacy of the FEIR/S (which was reserved for Phase II). Issues addressed in Phase I included evidence produced on technical competence, financing, capitalization, rates, proposed and existing facilities and service, impacts on existing interstate service, impacts on existing intrastate service, impacts on electric utility service, impacts on oil production, environmental impacts (applicants' presentations), market demand, gas supply, and the long-term feasibility of natural gas service to the EOR market. These hearings were transcribed and, as such, are available for viewing at FERC. It is important to recognize that the Phase I issues, as well as the FEIR/S adequacy issue in Phase II, are all part of the public hearing record that will be considered in the formulation of the Commission's decision regarding the competing proposals. Reliance on sworn testimony produced contemporaneously in Phase I not only is permissible for environmental decision-making, but obviously avoids any injudicious duplication of effort and waste of the Commission's resources. A certificate or certificates will only be granted if the Commission finds that the evidence produced in the record demonstrates that a project or projects is required by the public convenience and necessity. Unlike some Federal agencies which utilize a FEIS as the primary (sole) decision-making document, this is not the case at FERC, where public evidentiary hearings are conducted by an ALJ who entertains all issues, not just those related to environment, in arriving at the judgment on the public interest. NEPA does not require the Commission to make its final determination of the Public Convenience and Necessity (PC&N) within the four corners of an EIS. NEPA only requires that the Commission give adequate consideration to the environmental aspects of the proposed projects when its makes its final PC&N determination under the Natural Gas Act. The FEIR/S here, as supplemented, will constitute the investigative tool by which the environmental aspects of the various proposals are assessed, and will be among the various evidentiary and other material which the Commission will have before it when it makes its overall PC&N determination. Thus, in both the Draft and Final EIR/S, the staff identified that project need and its associated issue of "firmness of service" were outside the scope of the EIR/S. Both the Draft and the Final EIR/S clearly stated that a decision on the need for a proposed project had not yet been established, but would be based on a fully developed record from a formal public hearing, i.e., the Phase I hearings. The other non-environmental issues previously mentioned, e.g., firmness of service, etc., were also addressed in Phase I. In this manner, the process of preparing and publishing an EIR/S paralleled the economic and other non-environmental phase of the case. The entire process was and continues to be open, public, and administratively efficient.

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[1] On October 27, 1986, Administrative Law Judge (ALJ) Isaac D. Benkin of the FERC ordered that the El Dorado application be dismissed with prejudice. Actual dismissal was subject to the Commission's review. On October 20, 1987, the Commission adopted the initial decision of the Administrative Law Judge, dismissed the El Dorado application, and terminated the docket before FERC. Also, on June 30, 1987, the California State Lands Commission denied, without prejudice, El Dorado's application.

Although non-environmental topics such as project need and firmness of service were extensively dealt with in the Phase I hearing process, the FEIR/S does present basic information related to project need on pages 1-2 to 1-7 of Volume I. (Similar information had been previously presented on pages 1-1 to 1-5 of Volume I of the Draft EIR/S.) The reason for including this information was to meet the requirements of Section 1502.13 of the Council on Environmental Quality (CEQ) regulations for implementation of the procedural provisions of the National Environmental Policy Act (NEPA) which states that the EIS shall briefly specify the underlying purpose and need of the proposed action. Those readers desiring more detail on the issues of project need and firmness of service are referred to the publicly available hearing transcripts of Phase I. For those readers who previously submitted comments to the Draft EIR/S on project need and firmness of service, your comments are part of the public hearing record in Phase II of the hearing but the FEIR/S does not discuss the merits of these issues. As stated previously, this is the subject matter of Phase I. Some additional information however is presented below in response to conversations and correspondence with U.S. Environmental Protection Agency (EPA) staff that issues of gas supply and firmness of service are relevant and important in determining the preferred alternative in the FEIR/S and that such information would greatly enhance the ability of the general public and regulatory/resource agencies to understand and evaluate the merits of various alternatives.

Information concerning project need and firmness of service are presented in Sections 1.1 and 1.2 of Volume I of the FEIR/S, and the reader should first read that information before reading this supplementary information. The thrust of EPA's concern is that the FEIR/S should have first made a determination as to the need for this project(s) and second, which of the projects, including the intrastate alternative, could reliably serve this need. If in fact the intrastate alternative could meet one of the required goals of the project, i.e., provide a firm service of gas to the EOR producers, it is EPA's position that the intrastate alternative be instead certificated. If all other issues were equal, the FERC environmental staff would agree with EPA, but this is what administrative hearings at FERC are meant to resolve. In addition, the Commission has no power to certificate the intrastate alternatives since intrastate companies are not under the Commission's jurisdiction. To date, there has been a substantial record presented in the Phase I hearing regarding project need and firmness of service. The EOR operators have claimed that they are seeking a firm supply of gas and that interruptions or curtailment have great physical and cost consequences on their operations. The EOR operators allege that the present regulatory climate in California and available supply arrangements offered by the California gas distribution companies have three basic flaws:

1) Low priority of service -- service to the EOR market is of the lowest priority (i.e., subject to first curtailment) and

subject to interruption or discontinuance with little or no notice;

2) Short-term nature of existing rates -- rates are subject to month-to-month change yet operations are dependent upon long-term capital commitment and equipment installation; and

3) Current rates are only marginally competitive.

The EOR operators have also alleged that the California Public Utilities Commission's (CPUC) long-term transportation program is not synonymous with firm transportation service and that since the intrastate utilities offer gas transportation "subject to available capacity" existing at any time, the service being offered is actually interruptible service. They further allege that, as long as long-term transportation is tied to priority of service levels, there really is no firm transportation -- only varying levels of interruptible transportation. The CPUC and the California gas distribution companies dispute the EOR operators' allegations. As discussed below, it is difficult to accurately quantify the arguments set forth by the EOR operators. It is apparent, however, that there is widespread doubt by the EOR operators that, from a regulatory standpoint, the intrastates can compare to the alleged firmness of service offered by an interstate option. Indeed, the impetus behind the Mojave, Kern River, El Dorado, and WyCal proposals is the belief that the California intrastate companies cannot provide the level of service required by the EOR operators. Kern River also argues in its Reply Brief on Environmental Issues filed September 9, 1988, that SoCal has curtailed its electric utility and/or other industrial customers during three of the last four winters (Exhibit KR-138; 74 Tr. 10633-34) and even this summer has had to curtail deliveries to its electric utility customers by 37% in order to have capacity available to make storage injections to ensure high-priority services this winter. [2] In addition, it is also difficult to quantify and compare rates between interstate proponents who are offering a transportation service versus the intrastate proponents which are local distribution companies until signed gas supply and transportation contracts exist.

At the other end of the spectrum, both Kern River and Mojave (and now the Wyoming-California Pipeline Company) allege that they can fulfill the requirements of the EOR producers by providing a dedicated, non-interruptible, and therefore firm transportation service at competitive prices. The U.S. Department of Justice has advocated that the Commission issue a certificate to each of the applicants requiring each to mitigate environmental damage, and thereby allow the market to balance the service provided by each of the applicants and the California utilities against the cost of that service, including the cost of environmental mitigation. This position is in sharp contrast to EPA which recommends that the Commission not certify the interstate proposal(s) unless a significant difference in the level of service for the various alternatives is clearly substantiated.

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[2] Order Instituting Investigation and Emergency Order Authorizing Waiver of Curtailment Rules, Docket No. I. 88-08-052 (CPUC August 25, 1988) (mimeo. at 13).

In July, 1987, the California Energy Commission (CEC) issued its Biennial Report entitled California's Energy Outlook. In it, the CEC emphasizes that one of the key policy goals in California is to increase competition in the provision of energy to consumers. The report specifically recommends that "market forces should be allowed to determine whether an interstate pipeline be built to serve thermally enhanced oil recovery customers" [1987 Biennial Report; 30]. The report notes that while the CPUC has taken steps to assure EOR producers reliable utility service at competitive rates, the producers and other customers remain skeptical. The report states that an interstate pipeline in California would provide significant competition for bulk transportation of natural gas, which currently does not exist in the state. In addition, such a pipeline would provide greater access to other sources of natural gas, thus allowing for more competition in supplying EOR producers. The CEC does not believe an interstate pipeline serving EOR customers would result in a large rate increase to current utility customers. It also believes, however, that the marketplace should determine the need for a new interstate pipeline.

The FERC staff's position in Phase I of the hearing was that demonstrations of gas supply and market need are fundamental elements missing from each of the applications now in hearing and that evidence of a threshold throughput of 400 million cubic feet of gas per day (MMcfd) per day for delivery to the EOR market must be provided to the Commission via signed gas supply and transportation contracts.[3] Such contracts to date do not exist, with the exception of one contract between Kern River and Chevron. It was the opinion of the staff witness in Phase I that (a) the Mojave proposal did not offer truly firm service, (b) that Kern River's proposal cannot be shown to be firm at this time, and (c) that the intrastate utilities have not yet provided any contractual evidence or state regulatory approvals for firm, long-term service, as desired by the EOR operators.[4] Needless to say, there are widely varying positions with respect to project need and firmness of service issues.

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[3] This position does not apply to the WyCal application since it is filed under the Optional Certificate procedures discussed in Section 1.3.2

[4] As discussed later in this Introduction, the issue of need for the WyCal application is outside the scope of the current proceeding and this Supplement to the FEIR/S.

Based on this overview, it should be abundantly clear that the issue of project need and service firmness are not "technical" in the sense that they are resolvable by quantifying supply, demand, and pipeline capacity. Were such the case, then perhaps they would be amenable to disposition as NEPA issues. In this instance, however, need and service firmness are issues of regulatory policy. It is therefore the staff's position that, as such, they are most appropriately addressed via the formal proceeding in Phase I, rather than through the FEIR/S, so long as the FEIR/S identifies where these issues are being dealt with and that the process is open to the public. Such is the case both as identified in the Draft and FEIR/S, and the fact that the FERC hearing process is open to public participation. To review those issues at length again in the FEIR/S would be duplicative and against the intent of the CEQ regulations. The Commission also decided this very issue in Pacific Alaska LNG Co., et al., 9 FERC Pa. 61,334 at page 61,709, (December 12, 1979) and found that this procedure fully complies with NEPA's requirement.

In that case, the Sierra Club argued that the EIS for the Pacific Alaska LNG Company, et al. project, Docket No. CP75-140, et al., failed to analyze the project need, and thereby violated Section 102 of NEPA. As part of their motion, they discussed the significance of a letter to the Commission from the General Counsel of CEQ which stated that the FEIS did not address the question of need for natural gas in California. While the CEQ recognized that the issue was being addressed in the formal FERC proceeding, it suggested that the matter should also be considered in the FEIS because the Commission proceeding does not provide for the broad public review and comment required by NEPA.

The Commission's decision disagreed, stating that its final decision would address the issue of need in detail, that all interested parties had an opportunity to contribute to that record, and that its final decision would therefore be based on full information. The Commission also stated that the contention that its proceeding does not provide the for broad public review and comment required by NEPA ignored the fact that the Commission issued a Draft EIS and further issued a Final EIS (which contained the comments on the Draft EIS and responses to the comments). Moreover, the draft discussed the issue of the need for the gas. The Commission held that the public and other agencies had an adequate opportunity to comment on this discussion when the Draft EIS was circulated. Moreover, all interested parties had been provided an opportunity to contribute to the record. The Commission determined that such a procedure fully complies with the consultation procedure required by NEPA.

1.1 PURPOSE OF THIS SUPPLEMENT TO THE FEIR/S

On August 4, 1987, Wyoming-California Pipeline Company (WyCal) filed an application with FERC in Docket No. CP87-479-000 for an Optional Certificate (OC) [5] of Public Convenience and Necessity authorizing the construction and operation of (a) approximately 1,006 miles of 16-, 20-, 24-, 26-, 30-, and 36-inch outside diameter (O.D.) pipeline between Hams Fork, Lincoln County, Wyoming, and Bakersfield, California, by way of Topock, Mohave County, Arizona; (b) four compressor stations totaling 53,000 horsepower (hp) in Uinta County, Wyoming, Millard County, Utah, Clark County, Nevada, and Mohave County, Arizona; and (c) various measurement and communication facilities. The facilities would be used to serve the requirements of the EOR operations in the heavy oil fields in Kern County, California, and any other natural gas requirements in the proximity of the pipeline. The WyCal route is identical to segments of the routes proposed by Kern River and Mojave to serve the same Kern County EOR producers. In essence, WyCal combines the Mojave Project (Volume I of the FEIR/S) and the Kern River Project (Volume II), by using the East Las Vegas System Alternative route (Volume II). Additionally, WyCal proposes to construct approximately 55 miles of pipeline facilities in southwest Wyoming which were not addressed in the FEIR/S. Therefore, this document will only address those portions of WyCal's route not covered by the previous FEIR/S.

Concurrently, WyCal filed a request in Docket No. CP87-480-000 for a blanket transportation certificate in which WyCal proposes to be an open access transporter as provided by Section 284.221 of the Commission's regulations. WyCal proposes to provide firm transportation of up to 400 MMcfd from the Overthrust area to Bakersfield and an additional firm service of up to 250 MMcfd from Topock to Bakersfield; thereby providing firm natural gas transportation service of up to 650 MMcfd to meet the natural gas requirements of the EOR operations in Kern County as well as any other potential shippers requesting transportation service. To the extent capacity exists, WyCal would also provide an interruptible transportation service for parties requesting such service.

WyCal currently has no contracts with any party to provide a firm or interruptible transportation service. WyCal would be willing to transport gas from interconnecting pipelines from any source, including any part of the nation, on behalf of any willing shipper. WyCal would be actively seeking to secure contracts to transport natural gas; however, none of its capacity has been committed at this time. WyCal proposes its transportation service would be available on a nondiscriminatory basis to any shipper who is desirous of such service.

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[5] See discussion of the OC Program in Section 1.3.2.

When WyCal contracts to perform a transportation service for a shipper, the location of the receipt and delivery points will be established and WyCal would then seek authorization, if necessary, for the interconnections needed to carry out such activities.

On August 10, 1987, the CPUC filed a motion with FERC, in part to consolidate the WyCal application with the Mojave comparative proceeding. The motion claimed that the applications are mutually exclusive since (a) the EOR market will only support one pipeline and (b) WyCal proposes to occupy the identical rights-of-way (ROW's) proposed by each of the other applicants. On October 20, 1987, the FERC denied CPUC's motion to consolidate on the basis that consolidation would prejudice the parties and cause undue delay in the proceedings. As a result of the FERC decision, WyCal was not considered a competitive, mutually exclusive applicant and therefore, in a regulatory sense, not a directly competitive alternative to analyze in the FEIR/S. As stated on page 2-43 of Volume I of the FEIR/S, WyCal would get its own separate environmental review and the FEIR/S for the Kern River and Mojave projects would be used as the base for the environmental analysis of the WyCal project. This Supplement herein constitutes the tiered approach envisioned for WyCal at the time the FEIR/S was circulated in December, 1987.

1.2 SCOPE OF THE WYCAL SUPPLEMENT

On December 14, 1987, the FERC issued a Notice of Intent (NOI) to supplement the FEIR/S for the Kern River and Mojave EOR projects which was published later that week on December 18, 1987. The NOI was circulated to all Federal, state, and local agencies potentially concerned with the proposed pipelines and requested comments as to the scope of the Supplement. The NOI identified that since the WyCal project is basically the same as the Kern River and Mojave projects already analyzed in the FEIR/S, **THE SUPPLEMENT WOULD ONLY ADDRESS THOSE AREAS OF THE WYCAL PROJECT WHICH DEVIATE FROM THE KERN RIVER AND MOJAVE PROPOSALS AND THE EAST LAS VEGAS SYSTEM ALTERNATIVE PREVIOUSLY ANALYZED IN THE** FEIR/S. Deviations of compressor site locations are also examined in the Supplement. An exception to this was a review of the Wasatch Variation which was identified in Volume II of the FEIR/S and recommended by staff in Volume III.

The Wasatch Variation was developed by Kern River for the purpose of avoiding the Uinta National Forest, through which its proposed route would pass. This became necessary because the U.S. Forest Service (Forest Service) was strongly opposed to the proposed route through the Forest on environmental grounds. The Wasatch Variation was reviewed in the FEIR/S, and the staff recommended its usage in the FEIR/S if the Kern River route is certificated. Because WyCal's route is identical to the Kern River route through the Uinta National Forest, the recommended Wasatch Variation is equally relevant to the WyCal proposal.

Following issuance of the FEIR/S and the Commission's NOI to supplement the document to address WyCal's application, significant opposition to a portion of the Wasatch Variation developed in the Salt Lake City area. At an environmental scoping meeting for the WyCal project held in Salt Lake City on April 20, 1988, virtually unanimous opposition to the Wasatch Variation was expressed by local government officials, citizens groups and the Utah Chapter of the Sierra Club. Further, several localized alternatives to the variation were presented by the city officials of Bountiful, Utah, for staff evaluation and study. Local opposition to the Wasatch Variation was reiterated at separate meetings held that week between the staff and officials of Bountiful, West Valley City, and Salt Lake City. The Forest Service, which cooperated in the preparation of the FEIR/S, has also requested that the Wasatch Variation be re-examined in the Supplement. In view of the substantial controversy surrounding the use of the Wasatch Variation, additional analysis on this topic has been included in the Supplement with respect to the localized alternatives presented by the City of Bountiful. With respect to conflicts with specific landowners along the Wasatch Variation, such as city property owned by Salt Lake City and West Valley City, the staff feels that any such landowner conflicts can be resolved/mitigated through minor routing changes in the one-mile study area, design mitigation, and/or a construction technique mitigation. In these two areas, the Wasatch Variation is also within an established electric utility corridor. Such ROW conflicts are the subject matter of negotiations between the successful certificated applicant and the specific landowner at the time preceding construction. Each of the applicants have made commitments to these cities to work with them to resolve any landowner conflicts at the time construction is perceived and acquisition of ROW is necessary. This includes the possible expansion of the runway(s) of the Salt Lake City International Airport and the possible relocation of the existing electric utility corridor to accommodate the expansion. The staff believes that face-to-face negotiation and good faith consultation between landowner and project sponsor is the proper forum to resolve any such conflicts and not the FEIR/S process. Since issuance of the Draft Supplement, Salt Lake City has informed the Commission in its Reply Brief on Environmental Issues, dated September 12, 1988, that Kern River, WyCal, and Salt Lake City have concurred that the issues of Salt Lake City are significant issues capable of resolution and accordingly requests FERC Administrative Law Judge Isaac D. Benkin to make several findings, one of which is that "Construction, operation, or maintenance of the pipeline will not unreasonably interfere with the construction, operation, or maintenance of city facilities or delivery of city services, including but not limited to the Salt Lake City International Airport, the Salt Lake City and County Landfill, the Salt Lake City Sewage Treatment Facility, streets, storm drainage and water lines and any presently proposed or future modifications, expansions, or new construction relating thereto".

The FEIR/S recognized that certain impacts associated with the construction and operation of drilling rigs, wellhead equipment, gathering lines, treatment plants, field compression units, delivery lines, and access roads are unknown at this time. At this stage in the projects, it is simply too early to describe the extent of such new facilities or their specific locations. For example, the number, size, and locations of gathering lines and distribution facilities will depend upon the future actions of EOR and/or non-EOR operators, gas suppliers, gas distributors, federal and state regulations, gas brokers, and interstate pipelines. Until the extent, nature, and location of any new facilities is known, which is not expected to occur until after a FERC certificate is issued, their precise impacts cannot be analyzed. It is felt that the mitigation measures proposed in Volume III of the FEIR/S will adequately mitigate significant environmental impacts to the areas where such facilities would ultimately be built. An additional Mitigation Measure No. 156 has also been added to Section 3.1 of Volume III addressing these types of facilities. No further information is available to be included in this Supplement and the reader is referred to the FEIR/S. Issues that were previously discussed in the FEIR/S such as project need, firmness of service, and service to non-EOR users are not being supplemented and are outside the scope of this Supplement. **THE STAFF DOES NOT INTEND TO ALLOW THIS SUPPLEMENT TO RESURRECT OLD ISSUES NOR ENTERTAIN COMMENTS ON OLD ISSUES. THE COMMENT PERIOD FOR OLD ISSUES IS CLOSED.**

IT SHOULD BE EMPHASIZED THAT THE FOCUS OF THIS SUPPLEMENT IS LIMITED TO THE DIFFERENCES BETWEEN THE WYCAL PROPOSAL AND THE KERN RIVER/MOJAVE PROPOSALS. IN THIS REGARD, THE READER IS HEREBY ADVISED THAT THE WYCAL PROPOSAL WOULD HAVE NO NEW IMPACT ON ENVIRONMENTAL RESOURCES IN CALIFORNIA, COLORADO, NEW MEXICO, OR TEXAS WHICH HAVE NOT ALREADY BEEN FULLY ADDRESSED IN THE FEIR/S. Beyond the differences noted earlier, the discussion of issues previously addressed in the FEIR/S is not being supplemented and is outside the scope of this document.

1.3 PERMITS AND REGULATORY REQUIREMENTS

The reader is first referred to the discussion of these topics presented in the FEIR/S, I/1.2.

1.3.1 Background

As stated in the FEIR/S, under Section 7 of the Natural Gas Act, the FERC has sole responsibility for determining that interstate natural gas transportation facilities are in the public interest. If the FERC determines that there is or will be a need for a proposed service, it will issue a Certificate of Public Convenience and Necessity authorizing a proposed project. Until the FERC makes a decision based on a fully developed record, the need for a proposed project has not been established. This record will result from a formal public hearing which will examine every aspect of construction and operation of the proposed projects. Environmental impacts are an important and integral part of the overall examination. A certificate or certificates will be granted only if the Commission finds that the evidence produced on technical competence, financing, capitalization, rates, market demand, gas supply, existing facilities and service, impacts on existing interstate service, impacts on existing intrastate service, impacts on existing electric utility service, environmental impacts, impacts on oil production, and the long-term feasibility of the projects demonstrated that a project or projects are required by the public convenience and necessity.

The paragraph above was presented in the FEIR/S, I/1.2.1. It is relevant to the Mojave/Kern River/El Dorado proposals because they were filed as traditional Section 7-type applications before the FERC. From a regulatory standpoint, WyCal is noticeably different in that its proposal was filed under the "Optional Certificate" process set up by Commission Order No. 436, which allows for more expeditious treatment than that provided for applications filed under the traditional Section 7 process.

1.3.2 The Optional Certificate Process

As part of the Commission's Order No. 436 program, the Commission adopted regulations (at Section 157.100, et seq.) for Optional Certificates (OC's) of Public Convenience and Necessity. The following information as to the goals of the OC program is presented here for information only to enable the reader to understand the OC program. [6] This Supplement is not the vehicle to submit comments on the merits of the OC program. Such comments were sought and accepted during the rulemaking process setting up the OC program. Likewise, the appropriateness of the OC program in relation to WyCal's specific proposal is not the subject of this Supplement. Comments on whether WyCal has complied with the OC regulations have already been received in the form of various motions filed by parties to the proceeding.

The goals of the OC program, as stated by the Commission in its Notice of Proposed Rulemaking in Docket No. RM85-1-000, are:

1) To provide the full benefits of competition to consumers by facilitating easier entry and exit from services;

2) To ensure the most efficient scale for facilities by removing certification as a barrier to entry; and

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[6] This information is not inclusive of all the Commission's policy determinations concerning the OC program. Further reading of Commission Order Nos. 436 and 436-A is required for a fuller understanding of the OC program.

3) To provide incentives for competition where none exists by maximizing the use of alternative market access for producers and consumers.

To reach these goals, the Commission set up a program that provides a number of benefits to the pipeline in return for pipeline accountability. These benefits include:

1) Expedited certification as a result of fewer filing requirements (no market or gas supply data is required);

2) The grant of competing certificates - proposal is deemed to be non-exclusive if the pipeline has assumed the full risk of the project;

3) Rebuttable presumption of public convenience and necessity if pipeline has assumed the full risk;

4) Pregranted abandonment - certificate will be coterminous with the governing contracts when alternate supplies exist; and

5) Flexible receipt point authority.

A pipeline is eligible for an OC if it agrees to provide nondiscriminatory, open access transportation pursuant to an Order No. 436 blanket certificate and if the proposed rates for the service are designed so that no inappropriate costs are borne by the pipeline's customers.

As the Commission stated in Order No. 436 (Fed. Reg. 42,408 at 42,474):

> "If an application by any person for the issuance of a certificate under Subpart E fully complies with the requirements of Sections 157.102 and 157.103, thereby demonstrating the applicant's willingness to assume all economic risks of the proposed activities, the Commission will presume, subject to rebuttal, that the provisions of Section 7(c) of the Natural Gas Act have been satisfied and that the proposed new service is required by the present or future public convenience and necessity. Section 157.105 provides that a certificate requested under this Subpart E will be issued if the applicant complies with these requirements unless the presumption established by Section 157.104 is rebutted."

Thus, the basic premise of the OC regulations is that a project can be presumed to be in the public convenience and necessity if the applicant has assumed the full risk of the project or successfully negotiated the sharing of that risk. The provisions for an OC, namely the rate conditions and the filing requirements, are all tied to that premise. It is also important to note that no market or gas supply data are required to be filed by an OC applicant. These data are required to be supplied by both Kern River and Mojave because they did not file applications under the OC program.

1.3.3 Environmental Review Process

NEPA requires all federal agencies to take into consideration the environmental effects of their actions. When those actions involve projects that are found to be major federal actions significantly affecting the quality of the human environment, the agency must prepare an EIS describing the effects and how it intends to minimize them. The State of California has similar requirements to prepare an EIR under CEQA.

Because of the original number of competing applications and permitting agencies which must perform environmental analyses prior to issuing permits, it was apparent that much duplication could be avoided by preparing a joint EIR/EIS under the direction of a lead federal agency, FERC, and a lead state agency, SLC, to satisfy the requirements of all agencies. Such a procedure is encouraged by the CEQ regulations. Agencies which have requested cooperating agency status during the preparation of the FEIR/S remain as cooperating agencies for the Supplement. These include:

Advisory Council on Historic Preservation

Department of Agriculture:
- Soil Conservation Service
- U.S. Forest Service

Department of Defense:
- Department of the Air Force
- Department of the Army
- U.S. Marine Corps
- U.S. Army Corps of Engineers

Department of the Interior:
- U.S. Fish and Wildlife Service
- Bureau of Indian Affairs
- National Park Service
- Bureau of Land Management
- Bureau of Reclamation

Department of Transportation:
- Federal Highway Administration

Interstate Commerce Commission

The following information is being repeated and supplemented from the FEIR/S to allow the reader to identify the environmental process to date.

The first step in the EIS process is to publish a NOI for the preparation of an EIS in the Federal Register. The first NOI for the Mojave-Kern River Natural Gas Pipeline Project was published on August 23, 1985 and supplemented on December 10, 1985, and May 12 and June 25, 1986. The first step in the EIR process is the publication of a Notice of Preparation (NOP). The FERC and SLC circulated the NOI and NOP to all affected federal, state, and local agencies potentially concerned with the proposed pipelines.

The second step in the EIR/EIS process is termed scoping. The purpose of scoping is to determine the significant issues and concerns related to a proposed action which should be included in the EIR/EIS. Public meetings were used to supplement written scoping comment resulting from the NOI/NOP and to identify major issues and concerns. During February 1986, six scoping meetings were held in Albuquerque, New Mexico; Flagstaff, Arizona; Barstow, California; Bakersfield, California; Heber City, Utah; and Las Vegas, Nevada. An additional scoping meeting was held in Grand Junction, Colorado, in July 1986. [A total of about 100 people attended these meetings.] Separate meetings were also held with various federal agencies and the Laguna and Navajo Indian tribes.

A FERC representative opened each meeting by explaining the meeting's purpose and the roles of the federal, state, and local governments and of the project proponents. The proponents then described their respective projects using slides and maps. A question-and-answer period followed during which major concerns and issues were identified. Written concerns could also be mailed to the FERC. Additional concerns of the cooperating agencies were also included for discussion purposes. The issues of high and medium concern were discussed in the Draft EIR/EIS. Copies of the transcripts of the scoping meetings are available for viewing at the SLC in Sacramento and FERC in Washington, D.C. The FEIR/S addresses all substantive comments received.

The third step in the process was the publication and circulation of the Draft EIR/EIS for comment. The Environmental Protection Agency noticed the availability of the Draft EIR/EIS on January 23, 1987. Approximately 1,300 copies of the Draft EIR/EIS were sent to various federal, state, and local government agencies, Indian tribes, elected officials, environmental groups and organizations, the media, universities, local libraries, private citizens, and all parties to the FERC proceeding. Copies were also available for review at both FERC and SLC. The closing period for comments was April 24, 1987. Additional comments came in well into June, 1987. All comments as well as staff's response to these comments are reproduced in Volume V of the FEIR/S. In isolated cases, large amounts of background information were provided with the letters of comment, e.g., U.S. Borax and Chemical Corporation's comments. This background information was not reproduced in Volume V but is available for public review either at FERC or the SLC. Public meetings to receive comments on the Draft EIR/EIS were also held during the week of March 23, 1987, in Bakersfield and Barstow, California; Las Vegas, Nevada; and Salt Lake City, Utah. Transcripts of these proceedings as well as any appropriate staff responses were also reproduced in Volume V.

The fourth step in the process is the publication of the FEIR/S. Copies of the FEIR/S are available for review in the FERC Division of Public Information, Room 1000, 825 North Capitol Street, N.E., Washington, DC 20426, and at the SLC, 1807 13th Street, Sacramento, CA 95814. Copies have been sent to those who received the Draft EIR/EIS and to additional addresses received during the comment period. Further copies are extremely limited in number. It is suggested that those who are in need of a copy of the FEIR/S contact a BLM or Forest Service field office or local library. Copies of the FEIR/S are also available by purchase (Accession No. PB88-222393) from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161; telephone (703) 487-4650.

The final steps in the environmental review process vary and, in the WyCal case before us, required the FEIR/S to be supplemented. As previously stated, the FERC issued a NOI to supplement the FEIR/S and requested comments on its scope on December 14, 1987. As was done for the Kern River project, local public scoping meetings were held, specifically in the areas where the WyCal route would deviate from that previously reviewed for either Kern River or Mojave. On April 4, 1988, the Commission issued a notice announcing the locations of the scoping meetings which were held on April 18 and 20, 1988, in Las Vegas, Nevada, and Salt Lake City, Utah, respectively. Issuance of the Draft Supplement constituted Step 3 in the process for the WyCal proposal. The Environmental Protection Agency noticed the availability of the Draft Supplement on July 29, 1988. The distribution and availability of the Draft Supplement was similar to that of the FEIR/S. The closing period for comments was September 12, 1988. All comments, as well as staff's responses to these comments, are reproduced in Volume VII of the Final Supplement. In the case of comments filed by Southern California Gas Company (SoCal), a large amount of background contract sales data was provided as an appendix to their comments. This background information was not reproduced in Volume VII but is available for public review either at the FERC or the SLC. Public meetings to receive comments on the Draft Supplement were also held on August 22, 1988, in Las Vegas, Nevada, and on August 23, 1988, in Salt Lake City, Utah. Transcripts of these proceedings, as well as any appropriate staff response, are also reproduced in Volume VII.

The fourth step in the WyCal process is the publication of the Final Supplement. Copies of this Final Supplement are available for review in the FERC Division of Public Information and at the SLC. Copies have been sent to those who received the Draft Supplement and the FEIR/S and to additional addresses received during the comment period. Limited quantities are also available at the above addresses. As with the FEIR/S, the Final Supplement will also be available by purchase from the NTIS once existing supplies are exhausted.

Again, the final steps in the process vary, particularly for WyCal. At the time of the Draft Supplement, the staff stated, consistent with past Commission Orders and the schedule outlined by the ALJ, that the Final Supplement would be placed into evidence in the Kern River/Mojave hearing discussed in the beginning of this section. That may no longer occur, as discussed in the next section and Section 1.3.7 of this volume.

1.3.4 Status of the EOR Hearing

The Phase I hearing which began September 9, 1987, concluded on February 19, 1988. No interim or final decisions have been made with regard to issues discussed in Phase I. Resolution of the need and firmness of service issues is not expected until after the Final Supplement is issued.

On March 23, 1988, the Commission directed the ALJ to include in Phase II of the Mojave/Kern River hearing an examination and review of the environmental aspects of the WyCal application and to consider the environmental effects associated with granting one, two, or three of the applications. On April 12, 1988, the Phase II hearing commenced. The FEIR/S was placed into evidence with accompanying FERC staff testimony. Staff witnesses were extensively cross-examined concerning the adequacy of the FEIR/S. Testimony from other witnesses was also presented. Transcripts of this phase of the hearing are also publicly available for viewing at the FERC. The ALJ split the term Phase II into two subphases: Phase II-A and Phase II-B. Phase II-A first dealt with the FEIR/S adequacy issue (which concluded April 27, 1988). Phase II-A also included the two issues directed by the Commission in its March 23, 1988 order. The hearings on these latter two issues of Phase II-A, i.e., WyCal's base environmental case and the cumulative impact issues associated with construction of more than one pipeline, commenced June 21, 1988, and ended on June 23, 1988. Testimony on these two issues has already been filed before the ALJ and is publicly available for viewing at FERC.

The ALJ had defined Phase II-B as the forum to deal with the adequacy of the Final WyCal Supplement at such time as it is issued. Also, on July 1, 1988, the Commission directed the ALJ to issue a separate Initial Decision on the adequacy of the Final Supplement no later than December 31, 1988. Given this background, the staff stated that the Final Supplement was to be addressed by the ALJ.

However, on August 2, 1988, the Commission vacated in part its July 1, 1988, Order and established a new procedural schedule for both the ALJ and the staff preparing the WyCal Final Supplement as follows:

Initial Briefs (Phase II)	August 22, 1988
Reply Briefs (Phase II)	September 9, 1988
Initial Decision in Phase II (excluding Supplemental EIS on WyCal) and Certification of the Record to the Commission	October 31, 1988
Briefs on exceptions	November 15, 1988
Briefs on opposing exceptions	December 5, 1988
Supplemental EIS Issued on WyCal	October 1, 1988
Initial comments on Final Supplemental EIS filed with the Commission	October 15, 1988
Reply comments filed with Commission	October 31, 1988

Given the above schedule, it is the Commission's intent for the ALJ to issue a separate Initial Decision in Phase II of the proceeding concerning the adequacy of the FEIR/S for the Mojave/ Kern River projects by October 31, 1988. Concurrently, the Commission directed staff to issue the Final Supplement on October 1, 1988 and allow for a comment period on the Final Supplement with reply comments to be filed no later than October 31, 1988, the same date for which the ALJ's Initial Decision is due on the adequacy of the original FEIR/S.

1.3.5 Other Permitting Agencies

Federal permitting agencies who would be most extensively involved with these projects following issuance of a FERC certificate would be the Bureau of Land Management (BLM) and the U.S. Forest Service (FS). The BLM would issue ROW grants for all federal lands including those administered by the FS.

The federal ROW grants would contain general mitigation measures. After the ROW grant is signed, the applicant(s) would submit a detailed construction, operation, and maintenance (COM) plan to the designated federal authorized officer for review by the agencies. The COM plan would be developed for federal lands in accordance with applicable federal regulations [43 CFR Part 2882.2-4(c): Management of Oil and Natural Gas Pipelines and Related Facilities]. At a minimum the plan would include:

- o Schedules for construction of the pipeline and all related facilities and estimated construction costs;
- o Plans for the protection of the environment during construction, operation, and maintenance and abandonment of the pipeline; and
- o Plans for emergency repair of any rupture during operation and restoration of damage.

The BLM and other cooperating agencies would also conduct an environmental and engineering review of the COM plan. Where environmental impacts cannot be mitigated, the applicant(s) may be required to undertake minor realignments of the pipeline. If this realignment is outside of the one-mile analysis corridor addressed in the FEIR/S and Supplement, an amendment to the FEIR/S may be necessary. Following this review and determination by the authorized officer and cooperating agencies that pre-construction mitigation measures have been completed, a Notice to Proceed would be issued. The Notice to Proceed may also contain mitigation developed as a result of archaeological and biological surveys of the pipeline centerline and adjacent land.

Construction of a gas pipeline along portions of Mojave's (and WyCal's) proposed route across the Mojave Desert in San Bernardino County would not be in conformance with the BLM's California Desert Plan [1980] as it is not completely within designated corridors. The Plan designated several utility corridors across the desert to accommodate several different types of utility facilities. Utility needs not conforming with designated corridors may be allowed only through the BLM's plan amendment process. Due to the lack of conformance by Mojave (and WyCal), the Plan may have to be amended to allow approval.

The Plan could be amended through the FEIR/S, this Supplement, and subsequent Record of Decision. The amendment process requires a number of steps, including publication of a NOI and Notice of Availability of Planning Criteria in the Federal Register, preparation of an EIS or an Environmental Assessment, public review (90 days), and preparation of a Record of Decision (ROD) formally amending the Plan. The FEIR/S is intended to accomplish the EIS and public review steps in the event Mojave or WyCal is chosen and is allowed to use a route outside of designated corridors. Should BLM and FERC decide to allow Mojave to use a route outside of a corridor, BLM would issue a Record of Decision at the time the ROW grant is issued. This ROD would document BLM's decision and the rationale for allowing construction outside the corridor system. The ROW grant would indicate that the decision was approved through the plan amendment process.

During the preparation of the FEIR/S, the Forest Service determined that the Kern River (and now WyCal) proposals did not follow utility corridors identified in the various Forest Land

and Resource Management Plans. Therefore, the Forest Plans would need to be amended in accordance with the NFMA regulations [36 CFR 219.10(f)] before a BLM grant could be issued. A discussion on Plan amendment is found in Appendix F of Volume II of the FEIR/S. The Forest Service has stated that approval of these amendments would only be considered when all of the following items had a positive finding in the NEPA process and the FERC certification process:

- o The pipeline is found to be a legitimate use of National Forest System land;
- o The project(s) is shown to be essential to public welfare and is needed to meet increased local, regional, or national demand for oil recovery or other energy requirements, or is shown to result in a substantial increase in net public benefits; and
- o The project(s) is shown to be the preferred alternative.

Cultural resource protection and American Indian concerns were major issues discussed among FERC, BLM, Forest Service, Indian tribes, the Advisory Council on Historic Preservation (Advisory Council), and the various State Historic Preservation Officers (SHPOs). Agencies such as BLM and the Forest Service typically enter into a written Programmatic Memoranda of Agreement (PMOA or MOA) with the SHPOs and the Advisory Council to carry out their responsibilities under the National Historic Preservation Act (NHPA). For a variety of reasons, the FERC rarely enters into such PMOA or MOA arrangements, but certainly does not neglect its responsibilities under the Act. In the instant case, the FERC is the lead federal agency which has and will continue to coordinate with the above agencies and tribes to afford protection to cultural resources and address American Indian concerns. Because of the original number of competing applications, a decision was made to limit the type of review in the FEIR/S to that associated with a BLM Class I analysis. The same level of review will be applied to WyCal's proposal. When and if an applicant is certificated by FERC, additional work (including Class II and III analyses) will be conducted with FERC as the lead responsible federal agency. This will be coordinated with all the above entities. In such a manner, cultural resources will be afforded protection and American Indian concerns will be addressed; however, as stated in the FEIR/S, a PMOA or MOA will not be, nor does it have to be, the vehicle to achieve this. This, of course, does not preclude BLM or the Forest Service entering into separate PMOA's for lands administered by these agencies; however, this does not relieve the lead federal agency from its responsibilities.

1.3.6 Summary of Permits Required

The successful applicant(s) would be required to obtain permits and approvals from a variety of federal, state, and local agencies and Indian tribes. Major permits or approvals are listed in Tables 1.2-1, 1.2-2, and 1.2-3.

The SLC would act on ROW permits for lands under its jurisdiction. Other public agencies would use the FEIR/S or this Supplement as the basis for their decisions to issue approvals/ permits that are required for the project. State agencies in Arizona, New Mexico, Texas, Colorado, Utah, Nevada, and Wyoming would act on ROW permits for lands under their respective jurisdictions, and may use the FEIR/S or this Supplement, although these documents are not a prerequisite to ROW grants in those states. In addition to the Federal and state authorizing actions, all necessary county and local regulations with regard to pipeline construction and operation would have to be addressed and adhered to by the successful applicant(s). The FERC certificate does not obviate the applicant's requirement to comply with local and state permitting processes.

1.3.7 Commenting on the Final Supplement

Copies of this Final Supplement are available for review in the FERC Division of Public Information, Room 1000, 825 North Capitol Street, N.E., Washington, DC 20426, and at the SLC, 1807 13th Street, Sacramento, CA 95814. Approximately 1,300 copies of this Final Supplement have been sent to the public, all parties to the FERC proceeding, and federal, state, and local officials, and are available in limited quantities at the above addresses. Due to the length of the list of names and addresses receiving the Draft Supplement, the list is not reproduced in this document. Copies of the list are available for viewing at the SLC in Sacramento and FERC in Washington, D.C.

The FERC noticed the availability of this Final Supplement on October 3, 1988. The EPA will separately notice the Final Supplement's availability. As directed by Commission Order dated August 2, 1988, anyone wishing to do so may file comments on the Final Supplement no later than October 15, 1988, with reply comments to be filed no later than October 31, 1988. Comments should be sent to the Office of the Secretary, Federal Energy Regulatory Commission, 825 North Capitol Street, N.E., Washington, D.C. 20426. **THE SCOPE OF THE COMMENTS MUST BE LIMITED TO THAT DISCUSSED IN SECTION 1.2 OF THE INTRODUCTION.** Additional information about the project is available from Mr. Robert Arvedlund, FERC Project Manager, Environmental Analysis Branch, Office of Pipeline and Producer Regulation, Room 7312, telephone (202) 357-9091, or Ms. Mary Griggs, SLC Project Manager, telephone (916) 322-0354. **A COPY OF ALL COMMENTS SHOULD ALSO BE SENT TO MR. ARVEDLUND.**

Table 1.2-1

KEY FEDERAL AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
DEPARTMENT OF AGRICULTURE		
Forest Service	Concur with the BLM pipeline right-of-way grant and notices-to-proceed prior to issuance for National Forest System lands	Construction of pipeline and access roads
	Issue special use permits for construction activities outside of the pipeline right-of-way and related facilities as defined by 43 CFR Subpart 2880 and 36 CFR 251.33 Subpart B	All project features
	Issue permits for removal of commercial and noncommercial timber and other forest products	Removal of commercial wood products on FS lands
DEPARTMENT OF INTERIOR		
Bureau of Land Management	Issue federal ROW grant	Pipeline, access roads, power transmission lines, compressor stations
	Issue temporary use permit for construction ROW	Temporary construction activities, staging areas
	Issue non-competitive mineral material sales contract	Aggregate for compressor station construction, access road construction
	Issue antiquities permits and permits to excavate or remove archaeological resources on public lands under FLPMA and ARPA	All project features
Fish and Wildlife Service	Issue biological opinion on threatened, endangered or proposed species of fish, wildlife, or plants as part of Section 7 of Endangered Species Act for all federal actions.	All project features
	Issue special use permit/ROW to cross Havasu NWR	All project features
Bureau of Indian Affairs	Issue BIA ROW grant	Pipeline and access roads across Fort Mojave and Moapa lands
	Issue permit to use tribal water supplies	Hydrostatic testing
	Issue permit to cross Trust Lands and Allotted Lands	Pipeline, access roads
	Issue permit to excavate and remove archaeological resources on BIA and Indian Lands	All project features

Table 1.2-1 (continued)

KEY FEDERAL AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
DEPARTMENT OF INTERIOR (continued)		
Bureau of Reclamation	Issue special land use license or easement	Pipeline crossing Las Vegas Wash
	Issue special land use permit	Pipeline, access roads
DEPARTMENT OF DEFENSE		
Army Corps of Engineers	Issue nationwide and individual permit(s) (Section 404) for placement of dredged or fill material in waters of the U.S. or their adjacent wetlands	River or stream crossings for pipeline and access roads
U.S. Air Force	Issue easement to cross DOD lands; individual base commanders have final approval	Pipeline and access roads across Edwards and Nellis Air Force Base,
DEPARTMENT OF TRANSPORTATION		
Federal Highway Administration	Issue permits to cross Federal Aid Highways	Pipeline, access roads
ENVIRONMENTAL PROTECTION AGENCY	Issue NPDES permits for wastewater discharges	Any discharge of hydrostatic test water
FEDERAL COMMUNICATIONS COMMISSION	License to operate industrial radio service	License for each repeater station
FEDERAL ENERGY REGULATORY COMMISSION	Certificate of Public Convenience and Necessity	Pipeline construction and operations

Table 1.2-2

KEY STATE AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
ARIZONA		
State Lands Commission	Issue ROW easement permit to cross state lands	All project components
Department of Health Services:		
Bureau of Air Quality Control	Issue installation permit to locate facilities with the potential to emit over 75 tons of emissions per day	Compressor station(s)
State Water Resources Board	Issue permit for water appropriation and disposal or discharge of wastewater	Hydrostatic testing water appropriation and discharge
Bureau of Water Quality Control	Issue permit for the disposal or discharge of hydrostatic testing water	Hydrostatic testing of pipeline
Commission of Agriculture and Horticulture	Issue permit for the removal of commercially valuable cactus from ROW on state owned land	Pipeline, access roads
Department of Transportation	Issue permit to cross or encroach ROW of highways under state jurisdiction	Pipeline, access roads
Arizona State Museum	Issue State Museum permit to conduct work upon state lands, cultural resource clearance	All project components
CALIFORNIA		
Department of Fish and Game	Issue stream alteration agreement	Possible alterations of stream courses
	Issue MOU to handle and move desert tortoise	All project components
	Issue biological opinion on state rare and endangered species	Pipeline, access roads
Department of Transportation	Issue permits to cross state and interstate highways	Pipeline, access roads
Office of Historic Preservation	Issue cultural resource clearance	All project components
Office of Safety and Health Administration	Issue construction permit with attached safety standards	All project components
Air Resources Board	Issue permit to construct and operate	All project components
Colorado River Basin Regional Board	Issue permit for water discharge	Any discharge of hydrostatic test water
State Water Resources Board	Issue permit for water appropriation and disposal or discharge of wastewater	Hydrostatic testing water appropriation and discharge
Department of Water Resources	Issue permit to encroach or cross the California Aqueduct	Pipeline, access roads

Table 1.2-2 (continued)

KEY STATE AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
CALIFORNIA (continued)		
Reclamation Board	Issue encroachment permit to Central Valley Flood Control Plan	Pipeline and access roads crossing Kern River
State Lands Commission	Issue ROW permit to cross state lands (Land Use Lease Permit)	All project components
NEVADA		
Department of Conservation and Natural Resources/Division of Environmental Protection	Issue of NPDES permit for hydrostatic test discharge	Any discharge of hydrostatic test water
	Issue land clearing permits for state lands	Pipeline, access roads
	Issue permit to dispose of sewage and/or solid wastes	Pipeline construction, compressor stations
	Issue permit to develop a private water supply	Hydrostatic testing and compressor stations
State Engineer	Issue permit to drill a water well	Hydrostatic testing
Department of Transportation	Issue permits to cross state and interstate highways or use existing highway right-of-way	Pipeline, access roads
State Historic Preservation Office	Issue cultural resource clearance	Pipeline, access roads; clearance required prior to construction
UTAH		
Department of Health - Division of Environmental Health:		
Bureau of Air Quality	Submit notice of intent to construct	Pipeline, access roads
	Issue air quality permits	Compressor stations
Bureau of Water Pollution Control	Issue construction permit	Pipeline, access roads, compressor stations
Bureau of Sanitation	Meet potable water standards	Pipeline, access roads
Bureau of Solid Waste Management	Issue permit to dispose of sewage and/or solid waste	Pipeline construction
State Engineer	Issue permit to drill a private water supply well	Hydrostatic testing, water appropriation
	Issue permit for any stream alteration	Possible stream alterations caused by pipeline or access roads
	Issue hydrostatic test water appropriation permit	Hydrostatic test water acquisition

Table 1.2-2 (continued)

KEY STATE AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
UTAH (continued)		
Department of Natural Resources: Division of State Lands and Forestry	Issue ROW permit to cross state lands	Pipeline, access roads
Department of Transportation	Issue encroachment permit to cross state and interstate highways or use existing utility corridors	Pipeline, access roads
Division of State History: State Historic Preservation Office	Issue cultural resource clearance	All project components
WYOMING		
Department of Environmental Quality: Air Quality Division	Issue construction permits for a new source	Compressor station(s)
	Issue prevention of significant deterioration permit	Compressor station(s)
Water Quality Division	Issue hydrostatic test discharge	Hydrostatic test water discharge
State Waste Management	Landfill permit for solid waste disposal	Pipeline construction
State Engineer	Issue permit to appropriate groundwater	Hydrostatic test water acquisition
	Issue hydrostatic test water appropriate permit	Hydrostatic test water acquisition
Recreation Commission: State Historic Preservation Office	Issue cultural resources clearance	All project components
Public Lands Commission	Issue grant of ROW across state lands	Pipeline, access roads
State Highway Department	Issue license for encroachment on State highways	Pipeline, access roads

Table 1.2-3

KEY COUNTY AND LOCAL AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
ARIZONA		
Mohave County	Issue permits for road crossing and construction	Pipeline, access roads
CALIFORNIA		
Kern County:		
Board of Supervisors	Issue permit for crossing county roads	Pipeline, access roads
Air Pollution Control Board	Issue air quality permits	All project components
San Bernardino County:		
Flood Control District, Board of Commissions	Issue easement for crossing county drains	Pipeline, access roads
Road Department	Issue excavation permit for crossing county roads	Pipeline, access roads
Board of Supervisors	Issue franchise and excavation permit for encroachment of county roads	Pipeline, access roads
NEVADA		
Clark County Board of Commissioners	Issue conditional use permit to cross unincorporated areas	Pipeline, access roads
Clark County Board of Health	Issue air pollution control permit	All project components
Colorado River Commission	Issue permit for joint occupancy	Pipeline
Henderson City Council	Issue conditional use permit to pass through Henderson	Pipeline, access roads
Lincoln County	Issue permits for road crossing and construction	Pipeline, access roads
UTAH		
Beaver County	Issue road crossing permit	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads
Iron County	Issue road crossing permit	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads
Juab County	Issue road crossing permit	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads

Table 1.2-3 (continued)

KEY COUNTY AND LOCAL AUTHORIZING ACTIONS, WYCAL PIPELINE PROPOSAL

Agency	Nature of Action	Project Feature
UTAH (continued)		
Millard County	Issue special agreement for road crossing	Pipeline, access roads
	Issue conditional use permit for pipeline and related facilities	Pipeline, access roads
	Issue building permit for compressor station	Compressor station
Sanpete County	Issue building permit for above-ground structures	Pipeline, access roads
Summit County	Issue excavation permit for road crossing	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads
	Issue conditional use permit for pipeline	Pipeline, access roads
Utah County	Issue road crossing permit	Pipeline, access roads
	Issue building permit/plan approval for pipeline and related facilities	Pipeline, access roads
Wasatch County	Issue excavation permit for road crossing	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads
Washington County	Issue road crossing permit	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads
	Issue conditional use permit for pipeline and related facilities	Pipeline, access roads
City of Nephi	Issue road crossing and construction permit	Pipeline, access roads
WYOMING		
Lincoln County	Issue county road agreement for road crossing	Pipeline, access roads
	Issue building permit for above-ground structures	Pipeline, access roads
	Issue conditional use permit for pipeline and related facilities	Pipeline, access roads
Uinta County	Issue road encroachment license for road crossings	Pipeline, access roads
	Issue use certificate for above-ground structures	Pipeline, access roads, compressor station

1.4 ORGANIZATION OF THE REPORT

1.4.1 General Description

Because of the complexity of the competing and interrelated proposals, and the special needs of specific agencies, several documents have been prepared to address fully the environmental impact associated with each proposal. The FEIR/S (Volumes I through V) is the primary NEPA document; it includes full descriptions of all proposals and alternatives, as well as discussions of project-specific impact and cumulative impact. Mitigation measures are presented, their effectiveness evaluated, and unavoidable impacts identified. Where required by other statute or request, separate technical reports were prepared which provide further details for analyses contained in the FEIR/S. The reader is referred to the FEIR/S, I/1.3.1 for a discussion of the technical reports. Additional biological and cultural resource technical reports were prepared for those parts of the WyCal route that were not covered by the previous technical reports. The U.S. Fish and Wildlife Service reaffirmed their Biological Opinion, which was presented in FEIR/S, II/Appendix G, that should the WyCal (or any other applicant's) pipeline be certificated, it would have to comply with all provisions of their Biological Opinion, including the incidental take portions, in order to be in compliance with the Endangered Species Act.

1.4.2 Organization

The FEIR/S, as supplemented, is divided into seven volumes. Volume I contains project descriptions, environmental baseline and consequences, and mitigation concerning the Mojave, El Dorado, El Paso, and Transwestern proposals and their alternatives. To the extent that facilities would be required on Northwest's system to support an alternative to Mojave's proposal, issues and impact associated with such facilities are covered in Volume I. Use of the California intrastate natural gas pipeline systems as an alternative to Mojave or El Dorado is also addressed.

Volume II contains the project description, environmental analysis, and mitigation for Kern River's proposal (including the interconnection with Northwest), as well as selected route variations and system alternatives. Use of the California intrastate systems as an alternative to or in conjunction with Kern River's proposal is covered.

A detailed discussion of route variations and system alternatives considered but ultimately eliminated from detailed analysis is also presented.

Volume III, which contained the comparative analysis of the Mojave/Kern River proposals, the El Dorado interstate alternative, as well as alternatives including the California intrastate systems, has been amended to include the supplemental data analyzed in Volume VI and errata made since the publication of the FEIR/S. These data have been integrated into Volume III with new conclusions and recommendations presented. The amended Volume III is physically "bound" within Volume VI; however, if the reader so choses, the old Volume III can be discarded.

Volume IV is dedicated to map coverage at 1:250,000-scale of all pipeline facilities proposed or required by the interstate pipeline projects as well as those required for alternatives retained for detailed analysis. This volume was not reproduced for the FEIR/S but is incorporated by reference from the Draft EIR/EIS. The two maps which required minor modification are Map Nos. 3 and 7 of the Northwest maps. The Vernal compressor station on Map 3 should be moved approximately one inch north along the route and redesignated as an existing compressor station rather than a proposed one. No additional compression is required at this existing station. With respect to Map 7, the land ownership for the last half mile on the right hand side of the map should be redesignated as Forest Service land rather than private land. Also, on Kern River Map No. 6, the area between MP 280-310 should not be designated as having slope instability.

The additional maps at 1:100,000-scale for the WyCal route and its variations (which were presented in Appendix D of the Draft Supplement) are also not being reproduced for the Final Supplement but are incorporated by reference from the Draft Supplement. These additional maps should be incorporated into Volume IV.

In addition, several comments have been made by local officials concerning the usage of U.S. Geological Survey (USGS) maps in Volume IV, particularly through populated and/or developing areas where such maps may be outdated. The most current 7.5-minute-scale topographic maps have been utilized "to portray the route". In addition to using these maps, all portions of the routes have been examined by helicopter and/or fixed wing aircraft and automobile. As in many developed areas, or areas on the fringes of development, expansion and change occur rapidly and the cartigraphic representation by the USGS cannot keep pace. Staff is dependent upon field trips and data requests from affected communities to provide us with more up-to-date information. Such information has been taken into consideration in the preparation of the FEIR/S and the Supplement.

Volume V contains all the letters of comment received on the Draft EIR/EIS, as well as the transcripts of the public meetings to receive comment. Staff responses to these comments are also provided in Volume V.

Volume VI (this volume) contains all of the supplemental data necessary to incorporate WyCal into the FEIR/S. This document includes only new information which was necessary to evaluate the impacts associated with construction and operation of the WyCal proposed project. This includes approximately 55 miles of previously unanalyzed route in Wyoming; the Wasatch Alternatives, which were included for the reasons stated above; and the new segment of the North Las Vegas Variation.

Volume VII contains all the letters of comment on the Draft Supplement, as well as the transcripts of the public meetings to receive comment. Staff responses to these comments are also provided in Volume VII.

1.4.3 Revisions to the Draft Supplement

As a result of the massive number of comments on the original DEIR/S, as well as the original size of the DEIR/S, a system was developed which would assist the reader as to what staff did with each specific comment and more importantly precisely where staff made revisions, deletions, etc. The following system was developed for the majority of Volumes I and II and will be used again here in Volume VI:

- o If wording was deleted, the old wording is presented but crossed out by use of hyphens;
- o All inserted wording, whether replacement or totally new, is underlined.

As with the FEIR/S, there are some exceptions to the above. The Introdution was extensively modified such that old wording is not presented, but all inserted wording is underlined. Another exception is that changes to tables were simply made without showing the old numbers. Volume III was also rewritten as it pertained to WyCal. Editorial changes also were not underlined/hyphenated.

1.5 ERRATA

As a result of the FERC hearing "discovery process" and further review of the FEIR/S, several inconsistencies throughout the five-volume set were identified which should be corrected. The majority are associated with numerical changes. Some administrative changes have also been made. None of the revisions change the conclusions reached in the FEIR/S or now in the Final Supplement.

ERRATA (VOLUME I)

Page 1-9	Add the Bureau of Reclamation as a cooperating agency under the Department of the Interior

ERRATA (VOLUME II)

Table 3.3-23, Page 3-133	Delete last four entries of the table. The variation is only 109 miles long.
Page 3-133, Paragraph 2, Line 4	Change "twelve" back to "nine".
Table 4.2-8, Page 4-12	Replace with the attached revised Table 4.2-8.
Table 4.2-10, Page 4-26	Change "MP 690" to "MP 687".
Page 4-55, 1st Full Paragraph, Line 8	Change "...except in National Forests..." to "... except in certain portions of the National Forest"
Table 4.2-21, Page 4-76	The first entry for Bear River Valley should be under the Moderate column rather than the High Impact column. This will result in a change of total miles of impacts in Table 4.2-21 to 38.7 miles of High Visual Impact.
Table 4.4-1, Page 100	Replace with the attached revised Table 4.4-1.
Table 4.4-12, Page 4-126	Change the number of nesting raptors from "5" to "16".
Table 4.9-1, Page 4-243	Surface Water: Change "no significant long-term impacts are anticipated" to "some significant long-term impacts are anticipated."
	Freshwater Biology: Replace existing language with "There would be short-term impacts to freshwater biology during construction; some long-term, significant impacts are anticipated."
	Wildlife: The last sentence should be changed to read "Long-term productivity of certain species may be impaired."

Table 4.2-8

SIGNIFICANT GEOLOGICAL HAZARDS, KERN RIVER PROPOSAL

Mile-post	Location	Liquefaction/ Ground Failure	Surface Fault Rupture	Slope Instability	Ground Subsidence	Flash Flooding	Avalanche
59-84	Mainline	-	-	X	-	-	-
100-117	Mainline	-	-	X	-	-	-
126-129	Mainline	-	-	-	-	-	X
125-147	Mainline	-	-	X	-	-	-
148-152	Thistle Slide	-	-	X	-	-	-
159-168	Mainline	-	-	X	-	-	-
180-186	Mainline	-	-	X	-	-	-
184-186	Nephi Wasatch Fault	X	-	-	-	-	-
186-220	Mainline	X	-	-	-	-	-
230-719	Mainline	-	-	-	-	X	-
340-400	Mainline	-	-	X	-	X	-
407-640	Mainline	-	-	-	X	-	-
494-508	Mainline	-	-	-	X	-	-
639-648	Mainline	-	X	X	-	-	-
719-725	Tehachapi Mtns.	-	-	X	-	-	-
719	Garlock Fault	-	X	-	-	-	-
730-736	Mainline	X	-	-	-	-	-
736-740	Tehachapi Mtns.	-	-	X	-	-	-
750-751	Mainline	-	-	X	-	-	-
754-756	Mainline	-	-	-	X	-	-
754	White Wolf Fault	-	X	-	-	-	-
0-27	Taft Lateral	X	X	-	X	X	-
10-32	Kern Lateral	-	X	-	-	-	-

Table 4.4-1

SIGNIFICANT GEOLOGICAL HAZARDS, WASATCH VARIATION

Mile-post	Location	Liquefaction/ Ground Failure	Surface Fault Rupture	Slope Instability	Ground Subsidence	Flash Flooding	Avalanche
0-12	Upton	–	–	X	–	–	–
15-16	Weber River Alluvium	X	–	–	–	–	–
32-35	North side Sessions Mtns.	–	X	–	–	–	–
18-48	Wasatch Front	X	–	X	–	–	X
49-57	North Salt Lake to US 40	–	X	–	–	–	–
49-153	Bountiful to South Jordan	X	–	–	–	–	–

Page R-21	Add the following reference: "Mower R.W. & Cordova R.M., 1974; Water Resources of the Milford Area, Utah With Emphasis on Groundwater. Technical Publication 43, Utah Department of Natural Resources, Salt Lake City.

ERRATA (VOLUME III)

Any errata to Volume III have already been made in this Supplement.

ERRATA (VOLUME IV)

Kern River Map 6	The area between MP 280-310 should not be designated as having slope instability.
WyCal Map 18	Rudy Drain should be added to the Hydrology section at approximately MP 51.1.

1.6 EPA LETTER OF COMMENT

The FEIR/S was issued and noticed by EPA in the Federal Register in December, 1987. Although FERC did not specifically seek comments on the FEIR/S (as it is specifically doing on the Final Supplement), the EPA submitted comments on the FEIR/S on April 15, 1988. EPA's comments on the Draft EIR/S were included in Volume V of the FEIR/S, which was received as part of the hearing record on April 15, 1988. Due to the lateness of the comments and the regulations under the Administrative Procedures Act, submittal of EPA's comments on the FEIR/S without a sponsoring EPA witness was not permitted at that time. (The letter has since been entered into evidence without a sponsoring EPA witness.) Both the staff and EPA agree that this is an unnecessary expense and burden. The EPA is not a party to the FERC proceeding and their only request is that "the potential environmental impact associated with each alternative be fully considered during the certification process". This request will be fully satisfied, since the potential environmental impacts of all reasonable alternatives have been and will continue to be considered throughout the Commission's proceedings. Although EPA offers comments in four areas, the EPA letter is not a request to supplement the FEIR/S. Conversations with EPA staff also support this viewpoint. Regulations under both the Clean Air Act and CEQ also would have required EPA to specifically notify the FERC of any such request. Although the FEIR/S was being supplemented for another purpose (i.e., the WyCal project), the staff took the opportunity to respond to each comment in an open and public forum, i.e., the Draft Supplement. In fact, the staff already provided supplemental information with respect to two of the comments earlier in the Draft Supplement's Introduction. It is also less burdensome to the collective FERC/SLC/EPA staffs by addressing the comments in this Supplement rather than have EPA send a witness(es) to sponsor their letter(s) in a FERC proceeding. This would equally apply for EPA's letter of comment on the Draft Supplement which staff has responded to in Volume VII. The authors also feel that EPA is concerned about how the NEPA process fits into the FERC certification process. To the extent this Supplement at least sets forth that concern, one of the goals of their letter of comment will have been achieved. The following four comments were submitted by EPA along with FERC/SLC staff responses:

Comment No. 1

EPA continues to believe that the issues of gas supply and firmness of service should have been addressed in the EIR/S. Page S-6 of the FEIR/S states that, "the major concern regarding any alternative involving intrastate systems relates to their ability to provide a firm supply of gas to the Bakersfield area, one of the stated goals of the project." The FEIR/S concludes that the integrated intrastate systems alternatives would be far superior to any of the interstate systems discussed in the FEIR/S. It is our opinion that providing information on the ability of the various alternatives to meet gas supply and firmness of service goals in EIR/S would have greatly enhanced the ability of the general public and regulatory/resource agencies to understand and evaluate the merits of various alternatives.

Since the FEIR/S does not specify which alternatives meet the basic project purposes, EPA strongly supports certification of an intrastate alternative over an interstate alternative. Intrastate alternatives would avoid the environmental impacts identified in the FEIR/S for interstate pipeline construction. It should be noted, however, that conversations with the U.S. Fish and Wildlife Service indicate that ancillary facilities and oil field development associated with both the interstate and intrastate alternatives could have significant impacts to endangered species. The FEIR/S does not adequately address the impacts from this project-related development.

Response No. 1

Staff has supplemented its discussion on project need and firmness of service in the Introduction section of the Supplement and also has identified for the reader where even more information on these two subjects is available. Staff feels that inclusion of this type of information meets the requirements of Section 1502.13 of the CEQ regulations which states that the EIS shall briefly specify the underlying purposes and need of the proposed action.

With respect to facilities related to oil field development, the FEIR/S recognized that certain impacts associated with the construction and operation of drilling rigs, wellhead equipment, gathering lines, delivery lines, and access roads are unknown at this time (See the FEIR/S, I/page 1-6). At this stage in the projects, it is simply too early to describe the extent of such new facilities or their specific locations. The number, size, and locations of any such new facilities will depend upon the future actions of EOR operators, gas suppliers, gas distributors, federal and state regulations, gas brokers, and interstate pipelines. Until the extent, nature, and location of any new facilities is known, which is not expected to occur until after a FERC certificate is issued, their precise impacts cannot be analyzed. Staff agrees that such facilities, whatever they are, will be needed by all of the proposals and alternatives, including the intrastate alternatives. In that respect, the impacts, although unknown or at least non-specific, can be assumed to be equal for comparison purposes. It is felt, however, that the mitigation measures recommended in Volume III of the FEIR/S will adequately mitigate significant environmental impacts to the areas where such facilities would ultimately be built. This is also discussed in Section 1.2 of this Supplement.

Much in the way that site-specific environmental documentation tiers onto programmatic documentation, the staff designed mechanisms whereby additional analysis could be conducted (a) once a project was certificated, and (b) as the need developed (see Volume III, Mitigation Measures 69, 73, 75, 81, 82, 85, 89, 150, and 151). The U.S. Fish and Wildlife Service (FWS) also recognized that additional analysis would be conducted, as indicated by its 12 recommended conservation measures which the staff adopted as Recommendation No. 81, Volume III of the FEIR/S. These 12 measures were recommended and adopted to mitigate impacts associated with the known proposed facilities and the (at present unknown) ancillary facilities such as delivery lines and access roads. Implementation of the 12 conservation measures would also result in a finding of "No Jeopardy" to federally listed threatened or endangered species.

Comment No. 2

The FEIR/S does not include a cost-benefit analysis as requested by our June 11 comment letter. We concur with the FEIR/S interpretation that the Council on Environmental Quality (CEQ) Regulations at 40 CFR Part 1502.23 do not require the weighing of the merits and drawbacks of the various alternatives in a monetary cost-benefit analysis. However, Part 1052.23 does state that "in any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision." We believe that the issues of gas supply and firmness of service are relevant and important in determining the preferred alternative in the FEIR/S.

Response No. 2

Staff has supplemented its discussion on project need and firmness of service in the Introduction section of the Supplement and has identified for the reader where even more information on these two subjects is available. In addition, Page 1-8 of Volume I described other non-environmental considerations that the Commission will take into account in making its decision.

Comment No. 3

The FEIR/S does not assess project impacts to water bodies in terms of the specific beneficial uses and water quality standards included in the state basin plans. The FEIR/S states that the competitive nature of the project, the timing for coordination and the acquisition of information must await the outcome of the FERC certification process. We do not believe that these factors obviate the need to provide this information through the NEPA process, particularly given the project's potential to cause significant adverse impacts to water quality and aquatic habitat. Parts 1502.16(c) and 1506.2(d) of the CEQ regulations require an EIS to discuss any inconsistency of a proposed action with any approved state or local plans and laws. Part 1506.2(d) further requires an EIS to describe how inconsistencies between an agency's proposed action and state/local plans and laws will be reconciled.

Response No. 3

The FEIR/S states that there would be no significant surface water impacts associated with either of the preferred intrastate alternatives, or with the preferred interstate proposal, i.e., Mojave. For the remaining systems (i.e., Kern River and the East Las Vegas System Alternative), the FEIR/S assessed project impact to water bodies by documenting the number and location of each stream which would be affected, as well as identifying those crossings where existing water quality would be significantly degraded. As presented in both Volumes I and II, exceedence of state or federal water quality standards was the very first of several criteria used to delineate significant surface water impact (Volume I, page 4-18 and Volume II, page 4-19). These water quality standards are the principal focus of the state water quality plans that are required by Section 303 of the Clean Water Act. Downstream (beneficial) uses were also considered as an element of the significance criteria.

The FEIR/S reconciles the inconsistencies of project approval versus significant adverse impact by recommending both generic mitigation and the need for additional site-specific measures which would be developed if and when Kern River or the East Las Vegas System were certificated. In particular, Recommendation No. 35 (Page 3-11 of Volume III) requires that the successful applicant develop and implement plans acceptable to the "appropriate regulatory agency" (i.e., the Corps of Engineers/ EPA) and anti-degradation analysis to assure that the highest statutory and regulatory requirements and best management practices for pollutant controls are achieved in all streams affected by the project. Numerous other measures relevant to the protection of water quality are recommended in the soils, surface water, and freshwater and terrestrial biology portions of the recommended mitigation measures section in Volume III. Site-specific measures which would be developed and implemented, as necessary, include Measure Nos. 21, 27, 35, 53, 57, 62, and 147 (Volume III).

Staff believes that the FEIR/S has provided for the implementation of mitigation measures that will alleviate violations of water quality standards, recognizing that all activities by successful applicants will be subject to the development of detailed implementation and mitigation plans, particularly in the context of obtaining necessary permits under the National Pollution Discharge Elimination System (NPDES) program. The inclusion of the recommendations also satisfies the requirement of 40 CFR Section 1506.2(d) that an EIS include discussion of how to resolve potential conflicts with state plans or standards.

Comment No. 4

Based on the FEIR/S it appears likely that the interstate alternatives will involve the discharge of dredged and fill material into waters of the United States and therefore require authorization under Section 404 of the Clean Water Act. We reiterate the importance of informing the project proponents of the need to coordinate with the Corps of Engineers, Los Angeles, Sacramento and Omaha District offices to ensure project compliance with the Federal Guidelines for Specification of Disposal Sites for Dredge or Fill Material (40 CFR 230), required by Section 404(b)(1) of the Clean Water Act. EPA's evaluation will focus on the maintenance of water quality and the protection of 1) fisheries and wildlife resources, 2) threatened or endangered species, and 3) special aquatic sites, including wetlands.

As stated in our scoping and draft EIR/S comment letters, the 404(b)(1) Guidelines require the selected alternative to be the least-damaging practicable alternative available to achieve the project purpose [230.10(a)(1-2)]. The Guidelines also require that no discharge of dredged or fill material shall be permitted if these is a practicable alternative to the proposed discharge which would have less adverse impacts on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences.

Although the FEIR/S concludes that the intrastate alternatives are far less environmentally damaging than the interstate alternatives, the absence of NEPA documentation on the ability of these alternatives to provide a firm gas supply precludes determination of the project's compliance with the 404(b)(1) Guidelines. Based on the information in the FEIR/S and conversations with FERC staff we cannot determine whether the criteria used to analyze alternatives in the certification process are sufficient to meet the criteria used in the 404(b)(1) analysis. We are concerned that FERC's certification process may preclude consideration of the full range of practicable alternatives during the Section 404 permit process.

The project proponents should be apprised that under Section 404 of the Clean WAter Act, EPA will review, comment on, and make recommendations to the U.S. Army Corps of Engineers on the Section 404 permit applications. If no practicable alternatives to the discharge of dredged or fill material exist, EPA's recommendation of permit issuance or denial will consider whether the unavoidable impacts to waters of the United States will be offset by replacement of lost acreage and functional values, including in kind replacement of impacted vegetation.

Response No. 4

The staff agrees with EPA that close coordination between the project proponents and the Corps of Engineers (COE) related to the discharge of dredge and fill materials for buried utility line crossings may be essential, depending on which one, if any, of the projects are certificated. For precisely this reason, the COE was requested to be a cooperating agency and subsequently accepted this responsibility on September 5, 1985. To date, the staff has received absolutely no indication from the COE that the analysis and/or proposed mitigation does not suffice for the COE's purposes or that the COE's responsibilities have been or would be compromised by the FERC certification process. Additionally, as was pointed out in Response No. 3, Recommendation No. 35 provides both the COE and EPA a completely open-ended opportunity to guide the development, review, and approve implementation of site-specific plans to protect environmental resources in each and every instance of dredge and fill operations.

The project sponsors are aware that EPA will review, comment on, and make recommendations to the COE on the Section 404 permit applications; however, such applications have not nor will they be filed until and unless an applicant is certificated and determines that it will build its project. EPA also states that if no practicable alternatives to the discharge of dredge or fill material exist, EPA will consider whether the unavoidable impacts to waters will be offset by replacement of lost acreage and functional values, including in kind replacement of impacted vegetation. Staff submits that Recommendation No. 71 (Volume III) already achieves this goal.

2.0 DESCRIPTION OF PROPOSED PROJECT

2.1 INTRODUCTION

This chapter describes the WyCal proposal for transportation of natural gas from various points in the United States to the heavy crude oil fields of the southern San Joaquin Valley in the vicinity of Bakersfield, California. In addition to WyCal's proposed route, a number of routing alternatives have also been identified.

The Mojave, El Dorado, El Paso, and Transwestern summaries have been presented in the FEIR/S, I/2, while summaries of the Kern River and Northwest Proposals, and the No Action and Intrastate System Alternatives have been provided in FEIR/S, II/2.

2.2 WYCAL PROPOSAL

WyCal proposes to construct and operate pipeline facilities to connect major natural gas supply sources within the western United States and Canada with enhanced oil recovery (EOR) operators in the vicinity of Bakersfield, California, and other end users (non EOR) which may be in the proximity of its proposed system. WyCal contemplates that its facilities will interconnect with the facilities of Northwest Pipeline Corporation (Northwest) in the vicinity of Hams Fork, Wyoming, and with the facilities of El Paso and Transwestern in the vicinity of Topock, Arizona, for these gas supplies. The proposed interconnection with Northwest's mainline would provide potential access to major Canadian gas reserves. The proposed interconnection with El Paso and Transwestern would provide access to gas supplies in the major producing areas in the mid-continent, onshore and offshore Texas and Louisiana, and the Permian Basin areas of Texas and new Mexico through the exchange and displacement capacity of those systems. By this means, WyCal proposes to provide maximum gas supply flexibility for its potential shippers.

2.2.1 Facilities

The proposed WyCal Project would involve the construction of 16-, 20-, 24-, 26-, 30-, and 36-inch outside diameter (O.D.) pipeline to transport natural gas between Hams Fork, Wyoming, two locations on the Arizona/California border, and the Bakersfield, California, area (Figure 2.2-1). The proposed system would extend a distance of approximately 1,006 miles through 16 counties in five states distributed as indicated in Table 2.2-1. The line would have the capacity to deliver up to 650 million cubic feet of gas per day (MMcfd) to the Bakersfield area.

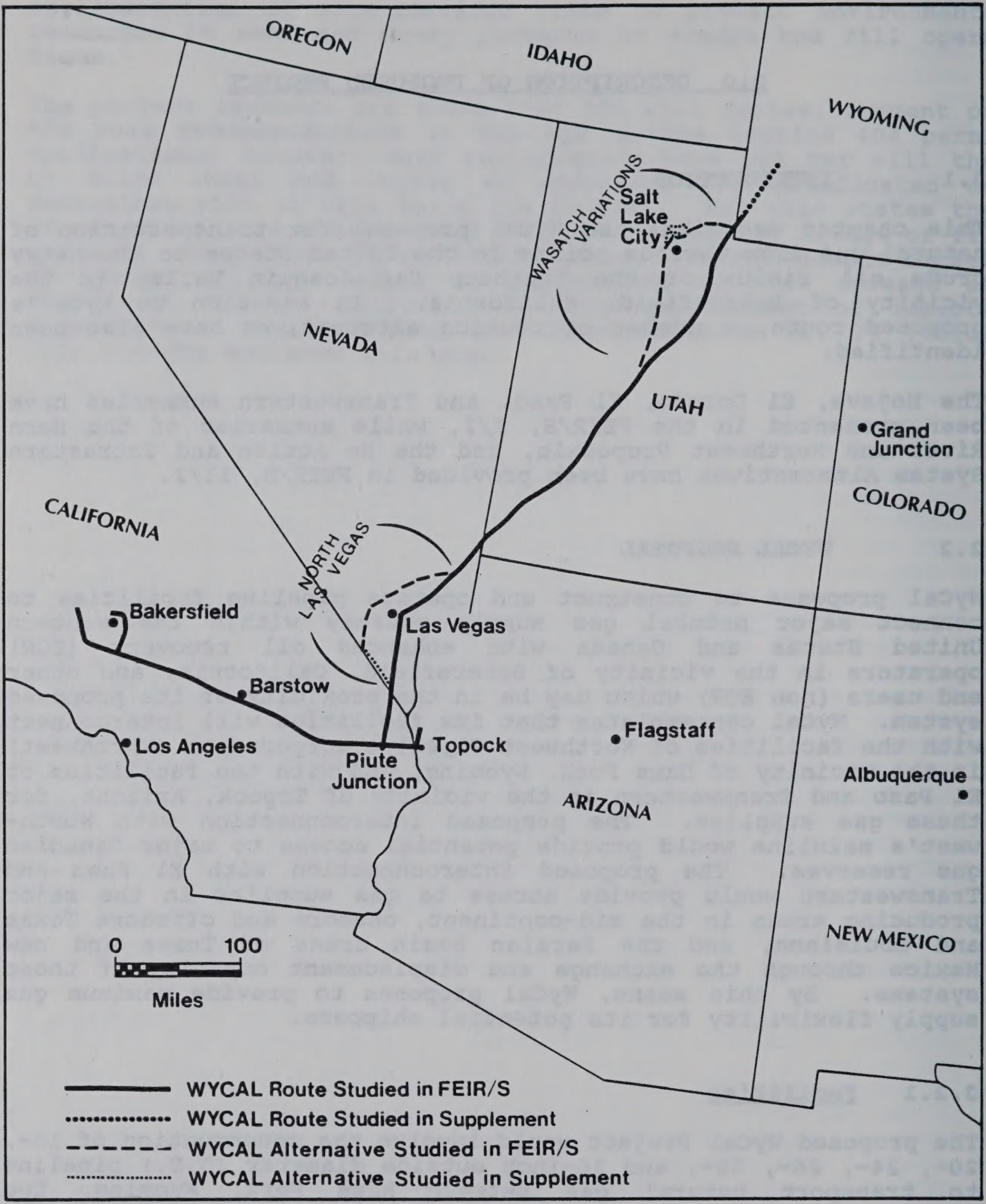
OREGON
IDAHO
WYOMING
WASATCH VARIATIONS
Salt Lake City
NEVADA
UTAH
Grand Junction
COLORADO
CALIFORNIA
NORTH LAS VEGAS
Bakersfield
Las Vegas
Barstow
Los Angeles
Topock
Piute Junction
Flagstaff
Albuquerque
ARIZONA
NEW MEXICO
0
100
Miles
WYCAL Route Studied in FEIR/S
WYCAL Route Studied in Supplement
WYCAL Alternative Studied in FEIR/S
WYCAL Alternative Studied in Supplement

Figure 2.2-1

LOCATIONS OF THE WYCAL PIPELINE PROPOSAL

Table 2.2-1

GEOGRAPHICAL DISTRIBUTION OF FACILITIES, WYCAL PIPELINE PROPOSAL

State and County	Miles of Pipe (approximate)	Compressor Station Name and (ISO) [1] Horsepower
WYOMING		
Lincoln	21	
Uinta	54	Anschutz, 10,600 hp
UTAH		
Summit	45	
Wasatch	26	
Utah	37	
Sanpete	4	
Juab	43	
Millard	63	Black Rock, 10,600 hp
Beaver	37	
Iron	50	
Washington	48	
NEVADA		
Lincoln	23	
Clark	129	Henderson, 15,900 hp
CALIFORNIA		
San Bernardino	229	
Kern	180	
ARIZONA		
Mohave	17	Topock, 15,900 hp

1/ ISO = International Organization for Standardization. ISO horsepower is the guaranteed power output measured at specific standard conditions, usually 59 degrees fahrenheit and a pressure of 14.7 pounds per square inch (atmospheric).

Four compressor stations providing a total of 53,000 hp would be constructed as a part of the project. (See Figure 2.2-2 for a typical compressor station layout.) The project would directly affect a total of 12,206 acres of land during construction and 6,103 during operation. The route would follow existing utility and transportation corridors for approximately 61 percent (614 miles) of its length. Maps of WyCal's proposed route and the relevant variations are presented in Appendix D. These maps should be incorporated into Volume IV of the FEIR/S. Unless significant changes to these maps are made, they will not be reproduced in the Final Supplement but will be cross-referenced to Volume IV of the FEIR/S.

WyCal's proposed pipeline system consists of two mainline elements (the northern and western legs) and five lateral elements. The proposed laterals either supply gas to the mainline or deliver gas to locations in the southern San Joaquin Valley near Bakersfield, California.

WyCal's northern leg would consist of about 567 miles of 30-inch O.D. pipeline extending between the proposed Whitney Canyon Meter Station in Uinta County, Wyoming, and a new meter station to be located at Piute Junction in San Bernardino County, California.1/ (See Figure 2.2-1.) This leg is designed to carry up to 400 MMcfd and would include three turbine-powered compressor stations totalling 37,100 horsepower. Except for the northernmost 15 miles (discussed below), the northern leg route is identical to that proposed to be used by Kern River between the vicinities of Evanston, Wyoming (KR milepost [MP] 44), and Las Vegas, Nevada (KR MP 491). 2/ Near Las Vegas, the northern leg adopts the East Las Vegas System Alternative route studied in Volume II of the FEIR/S and which WyCal would follow to an intersection ("Piute Junction") with the route proposed by Mojave south of Camino, California (MJ MP 32).

WyCal's western leg would consist of 231 miles of 36-inch O.D. pipeline and is designed to carry up to 650 MMcfd. This leg extends essentially east-west on the exact route proposed by Mojave (as modified in the FEIR/S III/3.1.13) between Piute

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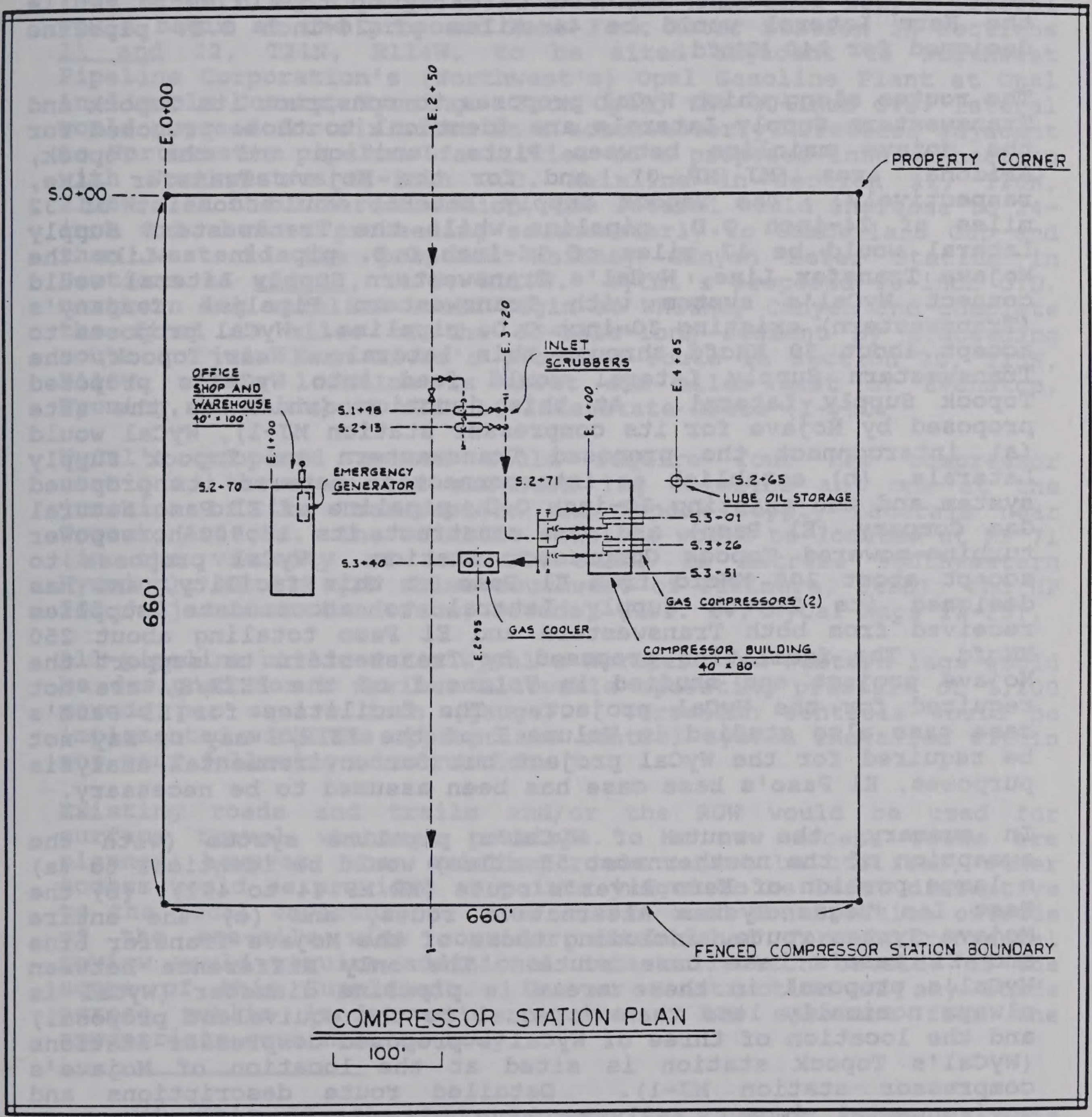
1/ Most mileages have been rounded to the nearest whole number. The only exception involves discussions of the very short segments where more precision is warranted.

2/ All MP's are approximate, and are based on "map miles", i.e., distances as would be scaled directly from a map. Map miles facilitate direct scaling but tend to underestimate actual pipeline milage by ignoring the vertical component of the route which results from elevation changes. MP referenced on the Kern River and Mojave systems will be preceded by the designations KR or MJ, respectively. All other MP's refer to the WyCal proposal unless otherwise noted.

Figure 2.2-2

TYPICAL COMPRESSOR STATION LAYOUT


E.2+50
E.0+00
PROPERTY CORNER
S.0+00
E.3+20
INLET SCRUBBERS
E.4+65
OFFICE SHOP AND WAREHOUSE 40' × 100'
S.1+98
S.2+13
E.4+00
E.1+00
S.2+70
EMERGENCY GENERATOR
S.2+71
S.2+65
LUBE OIL STORAGE
S.3-01
S.3+26
S.3+40
S.3-51
GAS COMPRESSORS (2)
660'
GAS COOLER
E.2+95
COMPRESSOR BUILDING 40' × 80'
660'
FENCED COMPRESSOR STATION BOUNDARY
COMPRESSOR STATION PLAN
100'

Junction and the Bakersfield area where Mojave's Kern Lateral separates from the Mojave mainline (MJ MP 261). From this location, WyCal's proposed Taft and Kern Laterals would extend west and north precisely following the routes of both Mojave's proposed mainline and Kern Lateral to their respective termination points. WyCal's Taft Lateral would consist of 63 miles of 30-inch O.D. pipeline designed to carry up to 410 MMcfd, while the Kern Lateral would be 44 miles of 26-inch O.D. pipeline designed for 240 MMcfd.

The routes along which WyCal proposes to construct its Topock and Transwestern Supply Laterals are identical to those proposed for the Mojave mainline between Piute Junction and the Topock, Arizona, area (MJ MP 0), and for the Mojave Transfer Line, respectively. The Topock Supply Lateral would consist of 32 miles of 24-inch O.D. pipeline while the Transwestern Supply Lateral would be 17 miles of 16-inch O.D. pipeline. Like the Mojave Transfer Line, WyCal's Transwestern Supply Lateral would connect WyCal's system with Transwestern Pipeline Company's (Transwestern) existing 30-inch O.D. pipeline. WyCal proposes to accept about 50 MMcfd through this lateral. Near Topock, the Transwestern Supply Lateral would feed into WyCal's proposed Topock Supply Lateral. At this junction (which is the site proposed by Mojave for its compressor station MJ-1), WyCal would (a) interconnect the proposed Transwestern and Topock Supply Laterals, (b) establish an interconnection between its proposed system and the existing 30-inch O.D. pipeline of El Paso Natural Gas Company (El Paso) and (c) construct its 15,900-horsepower turbine-powered Topock Compressor Station. WyCal proposes to accept about 200 MMcfd from El Paso at this facility, and has designed its Topock Supply Lateral to accommodate supplies received from both Transwestern and El Paso totaling about 250 MMcfd. The facilities proposed by Transwestern to support the Mojave project and studied in Volume I of the FEIR/S, are not required for the WyCal project. The facilities for El Paso's base case also studied in Volume I of the FEIR/S may or may not be required for the WyCal project but for environmental analysis purposes, El Paso's base case has been assumed to be necessary.

In summary, the route of WyCal's pipeline system (with the exception of the northernmost 55 miles) would be identical to (a) a large portion of Kern River's route (KR MP 44 to 491), (b) the East Las Vegas System Alternative route, and (c) the entire Mojave System route, including those of the Mojave Transfer Line and El Paso's base case route. The only difference between WyCal's proposal in these areas is pipeline diameter (WyCal is always nominally less than or equal to the equivalent proposal) and the location of three of WyCal's proposed compressor stations (WyCal's Topock station is sited at the location of Mojave's compressor station MJ-1). Detailed route descriptions and environmental impact analyses have already been completed on these aspects of WyCal's proposal and are presented in Volumes I and II of the FEIR/S. As a result, this Supplement will be limited to an analysis of those facilities which WyCal has proposed which differ from those covered in the FEIR/S.

The northernmost 55 miles of WyCal's proposed system consists of 40 miles of 20- and 24-inch O.D. pipeline (its Hams Fork Supply Lateral) and the initial 15 miles of its northern leg mainline. (See Vol. IV, WyCal Maps 1-3). [3] The Hams Fork Supply Lateral would begin at the proposed Hams Fork Meter Station in Sections 21 and 22, T21N, R114W, to be sited adjacent to Northwest Pipeline Corporation's (Northwest's) Opal Gasoline Plant at Opal in Lincoln County, Wyoming. From Opal, the 20-inch O.D. lateral would proceed for six miles in a southwesterly direction adjacent to Northwest's pipeline facilities to a proposed interconnection with Northwest's 22-inch O.D. mainline in Section 22, T20N, R115W. At the interconnection, the lateral would increase to 24-inch O.D. before proceeding southwesterly to Cumberland Gap and then west to the proposed Whitney Canyon Meter Station in Sections 16 and 17, T17N, R119W. WyCal's proposed 30-inch O.D. northern leg mainline would begin at Whitney Canyon and complete the final 15 miles of the 55-mile-long segment by proceeding south to join Kern River's proposed route in Section 20, T15N, R119W. This location is about six miles east of Evanston, Wyoming, on the south side of Interstate Route (I-)80.

WyCal's proposed system would require four new compressor stations, three on its northern leg mainline and one at the junction of its Transwestern and Topock Supply Laterals near Topock, Arizona. The mainline stations would be located at MP 71 (in the vicinity of Anschutz Ranch in extreme southwestern Wyoming), MP 279 (29 miles southwest of Fillmore, Utah), and MP 509 (adjacent to Henderson, Nevada) (Vol. IV, WyCal Maps 22-25).

All pipeline utilized for WyCal's Northern and Western legs would be designed for a maximum allowable operating pressure of 1,200 pounds per square inch (gauge). Corrosion controls would be implemented with the appropriate control system installed within one year following construction.

Existing roads and trails and/or the ROW would be used for surface travel whenever possible. No new access roads are planned; however, when existing roads cannot be utilized, other access would be provided at points judged to be least disruptive to the local environment. New access road construction outside of the one-mile wide corridor established for environmental review would require additional data collection outside of the scope of this Supplement. Use or construction of any roads across public lands would require a ROW easement from the appropriate governmental body.

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[3] This 55-mile long segment is a major focus of this Supplement. Although it is composed of both lateral and mainline pipe, this distinction is not referenced in the remainder of this Supplement.

The project would require a construction ROW width of 100 feet. Additional land would be required at water course, railroad, and major road and highway crossings. Additional space would also be required for an unknown number of metering stations, communications facilities, maintenance bases, and pipe storage and staging areas, as necessary. These land requirements would be about 0.5 acres for communications facilities, 10 acres each for the compressor stations, approximately 12 acres each for an unidentified number of pipe storage and staging areas, and usually less than five acres each for major river and road crossings. A permanent ROW of 50 feet would be maintained following construction. The locations of communications sites are presented in Table 2.2-2. The estimated cost of the proposed facilities would be $665.51 million in 1987 dollars.

2.2.2 Construction, Operation, and Maintenance

The reader is referred to the FEIR/S, I/2.1.1 for a general description of pipeline construction, operation, and maintenance procedures. Practices described in the following sections are unique to WyCal.

2.2.2.1 Pipeline Construction Methods

WyCal has provided information on the projected amounts of water by state required for hydrostatic testing as well as possible sources of water although the precise locations and the volumes of water to be withdrawn from each have not yet been identified. Possible sources of test water and approximate volumes by state are presented in Table 2.2-3. In addition to these sources, water may be obtained from individual water rights holders. Intake and discharge rates would vary widely but should be within the range identified in the FEIR/S, II/2.2.2.1. WyCal has indicated that hydrostatic test water discharge would be returned, where possible and environmentally appropriate, to its point of origin in Wyoming and Utah in accordance with state regulations and applicable requirements of the jurisdictional agency(s).

2.2.2.2 Construction Workforce and Schedule

WyCal proposes to utilize up to 12 spreads to complete construction. This would allow for concurrent construction at several locations. Assuming that 400 persons would be employed on each spread, a workforce of 4,800 persons would be necessary. Additional details on the construction workforce and schedule have been presented in the FEIR/S, II/2.2.2.2.

Table 2.2-2

PRELIMINARY LOCATIONS OF MICROWAVE COMMUNICATION SITES

Location	Legal Description	MP 1/	Site Status
NORTHERN LEG			
Hams Fork, WY	SW1/4 S22 T21N R114W	0	New (meter station yard)
Medicine Butte, WY (2 mi west)	SW1/4 S24 T16N R120W	8.2	Existing
Anschutz Compressor Station, WY	SW1/4 S36 T13N R121W	31	New (compressor station yard)
Elk Horn Peak, UT * (1.0 mi west)	NW1/4 S22 T1N R6E	53.5	New (private land)
Wide Hollow Radio * Tower (USFS), UT (1.9 mi east)	SW1/4 S12 T1S R12W	85	Existing
Lake Mountain, UT (36.0 mi west)	SE1/4 S21 T6S R1W	94.5	Existing
West Juab Valley, UT (4.0 mi west)	SW1/4 S35 T13S R1W	154.5	New (private land)
Scipio Pass, UT (1.5 mi east)	SE1/4 S34 T18S R3W	194.5	Existing
Black Rock Compressor Station, UT	NW1/4 S31 T24S R7W	239.2	New (compressor station yard)
Frisco Peak, UT (23 mi west)	SW1/4 S27 T26S R13W	255	Existing
South Pinnacle Pass Radio Tower, UT (3 mi east)	NW1/4 S30 T26S R8W	256	Existing (alternative site if Frisco Peak is unavailable)
West Mountain Peak, UT (Beaver Dam Mountains) (5.5 mi east)	SE1/4 S5 T42S R18W	374.5	Existing
East Mormon Mountains, NV (0.5 mi west)	NW1/4 S16 T12S R69E	396.5	Existing
Arrow Canyon Range, NV (13.5 mi west)	NE1/4 S15 T17S R63E	435	Existing

Table 2.2-2 (continued)

PRELIMINARY LOCATIONS OF MICROWAVE COMMUNICATION SITES

Location	Legal Description	MP[1]	Site Status
Henderson Compressor Station, NV**	NW1/4 S32 T2S R63E	469.4	New (compressor station yard)
McCullough Range, NV (7.5 mi west)	SE1/4 S16 T23S R62E	480	Existing
Mohawk Peak, CA (37 mi west)	SE1/4 S10 T16N R13E	510.4	Existing
New York Mountains, CA (22.5 mi west)	SE1/4 S30 T14N R16E	526.5	New (BLM)
WESTERN LEG			
Topock Compressor Station, AZ	SE1/4 S35 T16N R21W	0	New (compressor station yard)
Cave Mountain, CA (21.2 mi north)	NE1/4 S3 T11N R6E	79.5	New (private land)
Calico Peak, CA (10 mi north)	NE1/4 S2 T10N R1E	107.5	Existing
Kramer Hill, CA (6.5 mi south)	SE1/4 S4 T9N R6W	149.5	Existing
Shrub Peak, CA (2.5 mi north)	SE1/4 S34 T12N R14W	199.5	Existing
Breckenridge Mountain, CA (25 mi north)	NE1/4 S36 T28S R31E	214.8	New (private land)
Wasatch Variation (Alternative Sites for * above)			
Big Mountain, UT (7.5 mi south)	SW1/4 S7 T1N R3E	29	Existing
Nelson Peak, UT (7 mi west)	NW1/4 S35 T2S R3W	65	Existing
North Las Vegas Variation (Alternative Site for ** above)			
Blue Diamond Compressor Station, NV	NW1/4 S3 22S 59E	78.5	New (compressor station yard)

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[1] MP's are numbered from Hams Fork (MP 0) to Piute Junction (MP 607) and from Topock (MP 0) to the bifucation point near Bakersfield (MP 263).

Table 2.2-3

POSSIBLE HYDROSTATIC WATER SOURCES

State and Volume (Approximate)	Water Source	Permits Required
Wyoming, 35 acre-feet	Streams, Reservoirs, and Irrigation Canals throughout Wyoming	Wyoming Dept. of Water Quality
Utah, 195 acre-feet	Streams, Reservoirs, and Irrigation Canals throughout Utah	State of Utah, Division of Engineering, Dept. of Water Rights
Nevada and Arizona, 190 acre-feet	Colorado River below Hoover Dam	U.S. Bureau of Reclamation, and state agencies in NV, AZ, and CA
California, 235 acre-feet	Streams, reservoirs, and ditches in the Bakersfield area	Antelope Valley Water District
	Streams, reservoirs, and ditches in the Bakersfield and Mojave areas	Mojave Water District
	Streams, reservoirs, and ditches west of Bakersfield	Westside Water District
	Arvin-Edison Canal	Arvin-Edison Water Storage Project
	Purchased from Santa Fe Railroad	None

2.2.3 Environmental and Safety Controls

Environmental and safety controls pertinent to the WyCal application have been discussed in FEIR/S, I/2.1.1.4. WyCal has provided a very brief soil erosion control plan and revegetation plan but has agreed to adopt all mitigation measures presented in the FEIR/S, III, except for the recommended use of the Wasatch and North Las Vegas Variations.

2.2.4 Future Plans and Abandonment

WyCal has presented no future plans to perform additional work on its proposed transmission system. Abandonment procedures should closely follow those outlined in the FEIR/S, I/2.2.4.

2.3 WYCAL ROUTE VARIATIONS

2.3.1 Wasatch Variation

During the review of the Kern River proposal, Kern River identified the Wasatch Variation as an alternative to crossing about 100 miles of rugged, mountainous terrain which its proposed route would have encountered in Summit, Wasatch, and Utah Counties, Utah. This variation also avoided severe land stability problems encountered along the proposed route across the Uinta National Forest. Equally significant, the U.S. Forest Service has previously evaluated a north-south utility corridor across the Uinta National Forest, rejected it on the basis of environmental impact, and was categorical in its insistence that a route which circumvented the Uinta National Forest be found if Kern River's proposal was to proceed.

A description of the route known as the Wasatch Variation has been presented in the FEIR/S, II/2.4.1. Briefly, the variation diverges from the proposed route near MP 83 (KR MP 73), east of Upton. At this point, it would travel west adjacent to the valley between Upton and Coalville. From the area west of Coalville, the route would parallel the existing Mountain Fuel Resources, Inc. (MFR) pipeline to a ridge immediately east of Bountiful City and north of Holbrook Canyon in the Wasatch-Cache National Forest's Ward Canyon Utility Corridor. [4] The route would then turn southwest, diverging from the utility corridor and cross the Wasatch Range just south of the community of North Salt Lake. The variation would proceed west, passing just north of the Salt Lake International Airport along the existing Utah Power and Light (UP&L) high voltage electrical transmission ROW (see Vol. IV, Additional Wasatch Maps 15-18). The variation would then proceed south, again parallel to the UP&L ROW. This

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[4] MFR has recently changed its name to Questar Pipeline Company.

ROW is approximately 300 feet wide, passing directly through the community of West Valley City; thence south, passing west of Utah Lake and eventually rejoining the primary route near MP 214 (KR MP 204), in the vicinity of the Sevier River. WyCal states that this alternative (23 additional miles of 30-inch O.D. pipeline) would add $14.9 million to the project cost. This conflicts with Kern River which has previously stated that the project cost would be reduced by $4.5 million (even though the route is 23 miles longer) because of the extensive reduction in mountain-type construction. Kern River's costs are also for a larger diameter (36-inch) pipeline. Staff is in agreement with Kern River-project cost would be reduced.

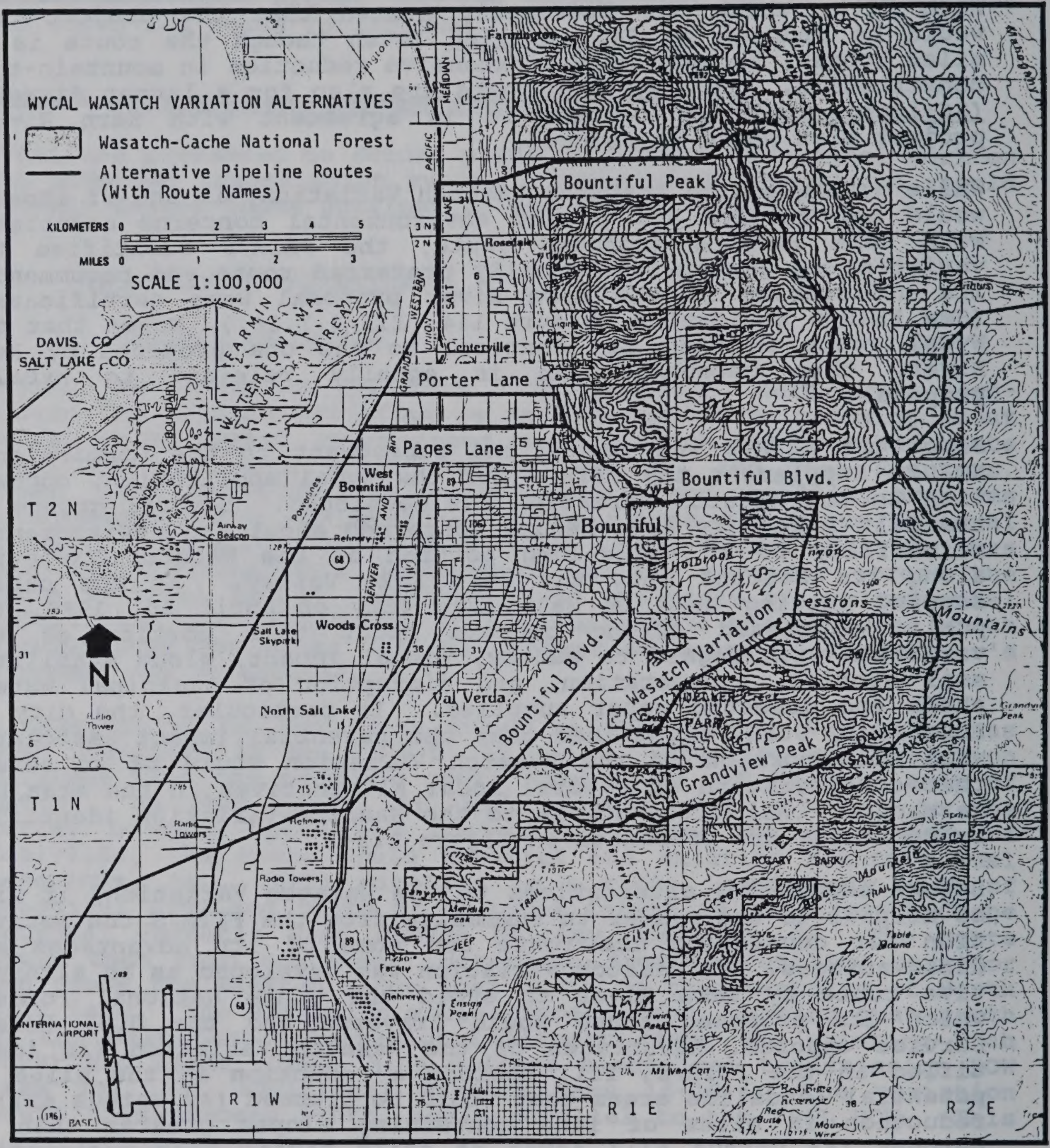
While acknowledging that the Wasatch Variation, in and of itself, would not resolve all of the environmental concerns associated with Kern River's proposed route, the FEIR/S identified the variation as the environmentally preferred route and recommended its utilization if the Kern River proposal were certificated. (See FEIR/S Mitigation Measure 144, III/3.1.18.) Given that the WyCal route in Utah is identical to the one proposed by Kern River, this recommendation is equally relevant to WyCal's proposal.

Since the FEIR/S was issued and subsequent to the Commission's NOI to Supplement the FEIR/S for the WyCal application, opposition to the Wasatch Variation has developed. Several groups in the Salt Lake City area became concerned about the environmental suitability of a 7-mile-long portion of the Wasatch Variation along its descent into the Salt Lake Valley. At the public scoping meeting held in Salt Lake City on April 20, 1988, the public expressed strong concern about this portion of the variation with regard to safety, visual impact, slope stability, soil erosion, revegetation, and disruption of municipal watersheds and domestic water supplies. In particular, the City of Bountiful, Utah, maintained that the potential impact associated with this portion of the Wasatch Variation would be so severe that consideration of several local alternatives in the area was warranted. All alternatives to the Wasatch Variation identified by Bountiful are presented on Figure 2.3-1.

Before addressing alternatives to the Wasatch Variation, it will be helpful to the reader to summarize from the FEIR/S the motivation for developing the route and some of its advantages and disadvantages. The Wasatch Variation was developed as an alternative route by Kern River to avoid the Uinta National Forest, which its proposed route would traverse and the U.S. Forest Service opposed. Advantages of the Wasatch Variation (as identified in the FEIR/S, III) include a reduction in the miles of potential landslide areas that would be crossed (42 versus 69); a reduction in miles of land containing slopes greater than 30 percent (44 versus 61); acres of soils having poor reclamation potential (703 versus 1,570); a reduction in impacts to moderate and high significance perennial streams (16 versus 30); acres of big game crucial or high priority habitat (493 versus 688), acres

Figure 2.3-1

WASATCH VARIATION ALTERNATIVES


WYCAL WASATCH VARIATION ALTERNATIVES
Wasatch-Cache National Forest
Alternative Pipeline Routes (With Route Names)
KILOMETERS 0 1 2 3 4 5
MILES 0 1 2 3
SCALE 1:100,000
N
Bountiful Peak
Porter Lane
Pages Lane
Bountiful Blvd.
Wasatch Variation
Grandview Peak
DAVIS CO
SALT LAKE CO
Farmington
Rosedale
Centerville
West Bountiful
Bountiful
Woods Cross
Val Verda
North Salt Lake
Salt Lake Skypark
Holbrook Canyon
Mountains
T 2 N
T 1 N
R 1 W
R 1 E
R 2 E
INTERNATIONAL AIRPORT
ROTARY PARK

of high significant impact to visual resources (28 versus 186), and minor differences in the amounts of native vegetation disturbed, big game species impacted, and reduced impacts to potential habitat of federally and state listed ~~threatened or endangered~~ wildlife species.

One of the major advantages of the Wasatch Variation would be to resolve the opposition which Kern River and WyCal face, i.e., the routing in a north-south direction across the Uinta National Forest. This problem is manifested in the Uinta's Standards and Guidelines for Utility Corridors.

While adoption of the variation would resolve the conflict with Uinta's Standards and Guidelines, it would create a similar conflict with the Standards and Guidelines for the Wasatch-Cache National Forest. This problem involves the route's deviation from the Ward Canyon Utility Corridor just north of Holbrook Canyon. This deviation was undertaken by Kern River to avoid major congestion and construction conflicts associated with the building of a pipeline through Bountiful. The route moved away from the utility corridor to an area which was less densely populated in an attempt to avoid these land use, safety, and construction problems. It is this portion of the variation which has now resulted in the need to study local alternatives involving the very same congestion and construction conflicts the Wasatch Variation was designed to avoid.

Major disadvantages of the Wasatch Variation as opposed to the proposed Kern River/WyCal mainline include crossing of the Wasatch Fault in a potentially more hazardous location and an increase in the number of intermittent streams crossed, coupled with an increase in the magnitude of unavoidable adverse impacts to municipal watersheds and domestic water supplies, e.g., Bountiful City and North Salt Lake.

Another major impact associated with the Wasatch Variation involves the effects of all impacts discussed above on an urban area. Impacts associated with landslides and slope stability, watershed issues, and visual impacts, although less severe along the Wasatch Variation, would occur in the immediate vicinity of a captive (and as a result, much larger) population. The adverse impacts associated with the proposed route would occur in sparsely populated areas of predominantly public land visited by a transient (recreational) and consequently smaller population. Making a judgement about when these impacts to population outweigh the impacts to the environment itself is of course difficult. As a result of these issues, the routes suggested by Bountiful City were reviewed. These four routes (Figure 2.3-1) were subjected in the Draft Supplement to the same environmental screening process as was previously utilized in the FEIR/S, II/2.7, with the exception that staff had reservations with respect to some of the alleged costs of these alternatives. As a result of this screening process, three of the recommended routes ~~have been~~ were included for further study in the Draft

Supplement. Staff ~~is~~ specifically ~~seeking~~ sought comments on the economic, environmental, and engineering aspects of these alternatives to the Wasatch Variation. The staff ~~is~~ also specifically ~~seeking~~ sought comments from the cities of Bountiful, Centerville, West Bountiful, and other local municipalities as to the acceptability of these alternatives in their city proper. Information from commenters is used throughout the body of the Final Supplement, as appropriate.

2.3.1.1 Bountiful Boulevard Alternative

This alternative begins where the Wasatch Variation would exit the Wasatch-Cache National Forest's Ward Canyon Utility Corridor near variation WV MP 39.6 in eastern Davis County. 5/ Rather than exiting, the alternative would proceed westward within the corridor ~~to--its--termination--at~~ toward the eastern edge of Bountiful. Here the alternative would join the proposed alignment of Bountiful Boulevard which it would follow south and southwest to rejoin the Wasatch Variation route near WV MP 46.4 south of Hooper Canyon. (See Vol. IV, Bountiful Boulevard Maps 4-5). The relevant portion of Bountiful Boulevard alternates between being dirt surfaced and paved, depending upon where residential development has occurred. Several sections have already been heavily developed, and others were observed during a field investigation in April, 1988, to be awaiting development in the immediate future. This alternative would route the pipeline through these areas within the 66-foot-wide boulevard ROW which it would share with ~~several~~ seven existing underground utilities, including domestic water lines and storm and sanitary sewers. The Bountiful Boulevard Alternative is about 6.7 miles in length, compared with 6.8 miles along the portion of the Wasatch Variation which it would replace. ~~WyCal-has-estimated-that-use of--this--alternative--would--increase--estimated--project--cost--by $14.5-million--in-1987-dollars.---The--staff-does-not--agree-with this-estimate-and-is-herein-seeking-a-more-thorough-cost-analysis from-both-Kern-River-and-WyCal.~~ In the Draft Supplement, WyCal estimated that use of this alternative would increase estimated project costs by $14.5 million in 1987 dollars. However, this represented an approximate 22.9-mile increase of 30-inch O.D. pipeline over the total length of the alternative, rather than the 6.7-mile length in question in the Bountiful, Utah, area. WyCal now estimates that use of this alternative (in the Bountiful area) would increase the cost over that of the Wasatch Variation by $0.65 million in 1988 dollars. Mojave estimates an additional $0.44 million in 1988 dollars for this same segment. Kern River takes a slightly different approach by estimating the cost of the three various alternatives from the point where all three deviate from the Wasatch Variation to the point where all three rejoin the Wasatch Variation just north of Salt Lake City

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5/ Variation MP's are taken from the location where the proposed route and the variation diverge.

International Airport. Therefore, Kern River's cost represents both an increased length as well as an increased pipeline diameter (36-inch O.D. versus WyCal's 30-inch O.D. costs). Kern River's costs are also in 1986 dollars rather than 1988 dollars as presented by Mojave and WyCal. Both methods can be used by making comparisons in "cost differences" versus "absolute dollars", e.g., Kern River states that a 14.3 mile segment of the Bountiful Boulevard Alternative would cost $18,301,000 versus the comparable 14.3 mile segment of the Wasatch Variation which would cost $12,301,000. This represents a $6 million difference which can be compared with the WyCal and Mojave costs. There is a sharp difference in cost estimates - a factor of ten. Inasmuch as the key difference between the two routes is a 4.4 mile segment within Bountiful Boulevard itself, the additional costs would be concentrated in this 4.4 mile segment. For Kern River, this represents a cost ratio of approximately 2.5:1 for pipeline construction in a residential area. This appears reasonable. WyCal's and Mojave's cost estimates are low.

2.3.1.2 Pages Lane Alternative

This alternative is identical to the first 2.2 miles of the Bountiful Boulevard Alternative. However, it would exit the Ward Canyon corridor slightly east of the corridor's end, heading northwest and adjacent to an existing 20-inch O.D. MFR gas pipeline to the northeastern edge of Bountiful. Here the alternative would turn due west to follow Pages Lane, an existing street which runs through Bountiful, Centerville, and West Bountiful. Like the developed areas along Bountiful Boulevard, Pages Lane would route the pipeline through residential/commercially developed areas within a 66-foot-wide street ROW. ~~A number of~~ Eight underground utilities are also located beneath and/or immediately adjacent to the Pages Lane ROW. This alternative would cross I-15 and the Denver and Rio Grande Western Railroad before turning southwest to follow the UP&L transmission ROW near the intersection of Pages Lane and 1100 West Street. The Pages Lane Alternative would proceed adjacent to the UP&L ROW to rejoin the Wasatch Variation route at WV MP 52.6 near the northern end of the Salt Lake City International Airport runway (see Vol. IV, Pages Lane Maps 6-9). This alternative is about 13.7 miles in length, versus 13 miles along the portion of the Wasatch Variation which it would replace. ~~WyCal has estimated that use of this alternative would increase project cost by $14.97 million in 1987 dollars. As with the above cost estimate, staff herein seeks a more thorough cost analysis from both WyCal and Kern River.~~ In the Draft Supplement, WyCal estimated that use of this alternative would increase project costs by $14.97 million in 1987 dollars. However, this represented an approximate 23.7 mile increase of 3-inch O.D. pipeline over the total length of the pipeline rather than the 13.7-mile length in question in the Bountiful, Utah, area. WyCal now estimates that use of this alternative (in the Bountiful area) would increase the cost by $0.46 million in 1988 dollars. Mojave estimates an additional $0.81 million in 1988 dollars. Kern River estimates that a 15.6-mile segment of the Pages Lane Alternative would cost $20,285,000 in 1986 dollars versus the $12,301,000 amount previously stated for the comparable Wasatch segment. This represents a $7.984 million difference which can be compared with the Mojave and WyCal costs. Again, there is a sharp difference in cost estimates - a factor of approximately 10 for Mojave and a factor of 17 for WyCal. It should also be noted that Mojave's estimate is almost double that of WyCal's. For this particular alternative, the Mojave and WyCal numbers again appear low. The main difference between this alternative and the Wasatch Variation is an approximate 2.8-mile segment within Pages Lane itself and the additional costs would be concentrated in this 2.8-mile segment. Using WyCal's past estimates for normal pipeline construction, 0.7 miles of additional pipeline would cost approximately $390,476, suggesting that the additional cost for residential/commercial type construction ($460,000-$390,476) is approximately $69,500. This is impossible to believe for 2.8 miles of pipeline construction in a highly residential/commercial area. Using Kern River's past estimates for the 36-inch O.D. pipeline in this area revealed that the cost ratio for pipeline construction in a residential/commercial area was approximately 4:1. This is higher than the 2.5:1 ration calculated for the Bountiful Boulevard Alternative but certainly appears more reasonable than the WyCal and Mojave estimates.

Another option suggested by Bountiful was to follow Porter Lane west from the foothills to the UP&L ROW. Porter Lane lies approximately 0.5 mile north and parallel to Pages Lane. This option would route the pipeline through residential/commercially developed areas and adjacent to several small industries with a street ROW almost identical to that proposed for the Pages Lane Alternative. Since the Porter Lane option lies within the analysis corridor of Pages Lane, it has not been accorded separate status for analytical purposes.

2.3.1.3 Bountiful Peak Alternative

This alternative would begin near MP 38.5 on the Wasatch Variation route immediately east of where the Ward Canyon corridor crosses the Morgan/Davis County line in the southwest quarter of Section 18, T2N, R2E. From this location, the alternative would head north-northwest to the south side of Bountiful Peak along a jeep trail/Skyline Drive which approximately follows the boundary between Davis and Morgan Counties. It would then follow the Skyline Drive road approximately three miles to the southwest side of Bountiful Peak. As it turns west from Bountiful Peak, it crosses 1,000 feet of contour trenches at the head of Ford Canyon, which is part of a major watershed restoration project. From Bountiful Peak, the route would proceed to the west along the ridgeline between Davis Creek and Ford Canyon. The alternative would enter the valley floor near the ~~southern edge~~ city limits of Centerville and Farmington, cross I-15 and the Union Pacific Railroad ROWs, then head due south adjacent to the railroad ROW until intersecting with a UP&L ROW north of 2900 South Street. The Bountiful Peak Alternative would follow this ROW to the south-southwest to rejoin the Wasatch Variation route at variation MP 52.6. (See Vol. IV, Bountiful Peak Maps 10-14.) This alternative is about 19.9 miles in length, versus 14.1 miles along the portion of the Wasatch Variation which it would replace. ~~WyCal has estimated that use of this alternative would increase project cost by $18.39 million in 1987 dollars. As with the other cost analysis, staff herein seeks a more thorough cost analysis from both Kern River and WyCal.~~ In the Draft Supplement, WyCal estimated that use of this alternative would increase project costs by $18.39 million in 1987 dollars. However, this represented an approximate 23.8-mile increase of 30-inch O.D. pipeline over the total length of the pipeline rather than the 19.9-mile length in question in the Bountiful/Farmington area. WyCal now estimates that use of this alternative (in the Bountiful/Farmington area) would increase the cost by $3.646 million in 1988 dollars. Mojave comes in low with $2.2 million in 1988 dollars. Kern River estimates that a 20.4-mile segment of the Bountiful Peak Alternative would cost $19,558,000 in 1986 dollars which represents a $7.257 million difference. Staff agrees with the WyCal estimate.

~~Staff, however, has estimated that the 19.9 miles associated with the Bountiful Peak Alternative would cost approximately $3.2 million (i.e., 40%) more than the portion of the Wasatch Variation it would replace. This raises the question of whether this alternative would be dropped from further detailed analysis because of screening criteria E-4 identified in FEIR/S, II/2.7. While staff admits that this alternative would not affect any nearby homes, thus avoiding one of the problems associated with the Wasatch Variation and the Bountiful Boulevard and Pages Lane Alternatives, it does not resolve problems associated with landslide potential, slope steepness, erosion, or water quality issues; it would merely shift these problems to a different venue, and to the Rosedale/Farmington area. Staff, however, wants to be fair and open concerning this alternative and solicits comments on the full merits of this alternative. The staff, however, does have reservations concerning the adoption of this alternative as a staff recommendation to the FERC/SLC.~~

2.3.2 North Las Vegas Variation

The North Las Vegas Variation was developed by Kern River as an alternative to crossing the Sunrise Mountain Instant Study Area (ISA), the Rainbow Gardens, the Las Vegas Wash and the southern Las Vegas Valley in general. The description of the North Las Vegas Variation has been presented in the FEIR/S, II/2.4.4. The FEIR/S recommended that the North Las Vegas Variation be utilized if the Kern River proposal were certificated (See FEIR/S Mitigation Measure 152, III/3.1.18).

Given that the WyCal route would encounter similar (if not identical) conflicts along its proposed traverse of the Las Vegas Valley, this recommendation is equally relevant to WyCal's proposal. However, because of the major differences between the Wycal and Kern River routes south and west of Las Vegas, a "WyCal segment" of the North Las Vegas Variation route would be required in order to connect the variation to WyCal's proposed route south of the Las Vegas area.

For the purposes of this Supplement, the "North Las Vegas Variation" will refer to the route by the same name described in the FEIR/S, II plus the WyCal segment of this variation. The WyCal segment would begin where the North Las Vegas Variation rejoins Kern River's proposed route near MP 534 (variation MP 110) (KR MP 534 in Section 6, T27S, R59E, Clark County) and proceeds to the southeast generally along the Nevada/California border on the Nevada side. Near State Highway 164, the WyCal segment would swing away from the border to avoid the northern end of the New York and Castle Mountains while still paralleling the state line within Nevada. The segment then bends southeast to rejoin the border and intersect with WyCal's proposed route where it exits Nevada in Section 23, T31S, R63E, near NL 528. (See Vol. IV, North Las Vegas Maps 19-21.)

The WyCal segment of the North Las Vegas Variation was not addressed in the FEIR/S. It totals about 41 miles in length and would bring the overall variation mileage to 151, compared with 118 miles along the portion of WyCal's proposed route which the North Las Vegas Variation would replace. It would also require relocation of WyCal's proposed 15,900 hp Henderson Compressor Station to Section 3, T22S, R59E, about 17 miles north of Goodsprings, Nevada, near Variation MP 79. (This station is hereinafter referred to as the Blue Diamond Compressor Station. See Vol. IV, Wycal Map 29.) Use of this variation would increase estimated project cost by $18.5 million in 1987 dollars. Staff agrees with this estimate.

2.4 SYSTEM ALTERNATIVES TO WYCAL

2.4.1 Kern River Proposal and Alternatives to Kern River

(See FEIR/S, II/2.2, 2.3, and 2.4.)

2.4.2 Mojave Proposal and Alternatives to Mojave

(See FEIR/S, I/2.2 through 2.6.)

2.4.3 East Las Vegas System Alternative

(See FEIR/S, II/2.5.3.)

2.4.4 Northwest/PGI/Integrated Intrastate System Alternative

(See FEIR/S, II/2.5.4.)

2.5 NO ACTION PROJECT ALTERNATIVE

(See FEIR/S, II/2.6.)

2.6 ROUTE VARIATIONS AND SYSTEM ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

A detailed discussion of the route variations and system alternatives considered but eliminated from detailed analysis are presented in the FEIR/S, II/2.7. This section details the criteria utilized to eliminate some of the routes. Two additional routes have been eliminated from further detailed analysis from the WyCal proposal. These routes were eliminated from further consideration utilizing screening criterion E-4. This criterion is concerned with environmental and economic concerns (see FEIR/S, II/2.7.4).

Staff also considered whether variations to WyCal's route in Wyoming warranted detailed examination. A portion of the WyCal route diverges significantly from Kern River's proposed route, apparently to swing close to the Whitney Canyon area, a possible (but not guaranteed) source of gas for both the WyCal and Kern River projects. BLM has expressed generic concerns about the WyCal route in the Whitney Canyon area and perhaps the ability to better utilize existing corridors. Staff's position is that a viable alternative to the WyCal route in Wyoming is the already studied and acceptable route Kern River proposes in Wyoming. Both projects anticipate the possibility of obtaining volumes of gas from the Whitney Canyon area and that supplies of gas from these and other fields will be processed at the existing Whitney Canyon gas processing plant. As stated in the FEIR/S and in the Introduction to this Supplement, it is simply too early, at this stage of the projects, to describe the extent of new facilities associated with drilling rigs, wellhead equipment, gathering lines to either project, treatment plants, etc. Therefore, it is further felt that examining other variations which may or may not pick up gas from Whitney Canyon is an unnecessary exercise, particularly given that the Kern River route is an acceptable ~~(and perhaps preferable)~~ route and it also contemplates the Whitney Canyon area as a possible supplier of gas. It is also felt that in this area of Wyoming, additional variations would be dropped from detailed examination as a result of screening criteria E-5 or E-6 described in FEIR/S, II/2.7. Staff has not identified specific environmental concerns in the Whitney Canyon area. Both the Wycal and Kern River routes in Wyoming are acceptable to staff with the implementation of the mitigation measures presented in FEIR/S, III.

2.6.1 Grandview Peak Alternative

This alternative to the Wasatch Variation would begin near variation MP 38.5 approximately where the Ward Canyon Utility Corridor enters Davis County. (See Figure 2.3-1). This alternative, however, would head south across the Sessions Mountains to a point on the Davis/Salt Lake County line about one mile west of Grandview Peak. The route would then proceed west approximately along the county boundary to rejoin the Wasatch Variation route near its MP 46.4 intersection with Bountiful Boulevard's proposed alignment south of Hooper Canyon. The Grandview Peak Alternative is about 9.7 miles in length, versus 7.9 miles along the portion of the Wasatch Variation which it would replace.

This route was originally examined by staff in February, 1986, by helicopter when examining variations to the Kern River Mainline in the mountainous portions of Utah. The location of the route is on extremely narrow ridgelines and would require extensive blasting to create space for pipeline construction. The route is also in an area of extremely shallow and dry soils which are highly erosive. Furthermore, the route has poor vegetation recovery potential and could adversely effect the Mill Creek Municipal Watershed, a key watershed for Bountiful City/North Salt Lake domestic and agricultural uses. Landslides and slumps also exist in the area which could potentially effect pipeline integrity. The alternative route also lies entirely outside of a designated utility corridor within the Wasatch-Cache National Forest and would require a Forest Plan amendment. This amendment would most likely be considered "a significant change in Forest Plan direction for the Wasatch Front Management Unit;..." [Bosworth, 1988].

Based on these earlier findings, the Grandview Peak Alternative offered no clear economic or environmental advantages over the portion of the Wasatch Variation which the alternative would replace. The alternative would be extremely costly due to the significant amount of narrow ridgelines which would require extensive blasting and environmental concerns associated with the Wasatch Variation would not be alleviated. On the contrary, the Grandview Peak Alternative would have environmental impacts equal to or exceeding those associated with the Wasatch Variation. The alternative was therefore dropped from detailed analysis both then and now.

2.6.2 Stateline South Variation

This variation was developed by WyCal to reduce pipeline mileage on its proposed system south of the Nevada/California border. The variation would begin near NL 568 where WyCal's proposed Northern Leg and the North Las Vegas Variation intersect on the Nevada/California border, and proceed to the southeast along a heading which more or less parallels the state line on the Nevada side. In Section 32, T32S, R65E, the variation would bend to the east-southeast, proceeding to a crossing of the Colorado River north of the Fort Mojave Indian Reservation and south of Riviera, Arizona. The variation would then turn south, following adjacent to an existing 16-inch O.D. Southwest Gas Corporation (Southwest Gas) ROW to an intersection with the existing Transwestern facilities in Section 17, T18N, R21W, where WyCal proposes to locate its Transwestern Meter Station and begin its Transwestern Supply Lateral. (See Figure 2.2-1.)

Adoption of the Stateline South Variation would eliminate that portion of WyCal's proposed mainline between the Nevada/California border and Piute Junction. It would also require WyCal's proposed Transwestern and Topock Supply Laterals to be increased to 36-inch O.D. pipelines (rather than 16- and 24-inch O.D. pipelines as currently proposed). The variation itself would be 31 miles long, compared to 39 miles along the portion of WyCal's mainline route which this variation would replace. Staff has estimated that use of this variation would increase estimated project cost by approximately $12.6 million in 1987 dollars, primarily because of the increased diameters for the two laterals.

Pipeline construction of this variation would generate Class II impacts to wetland/riparian areas crossing the Colorado River. The variation would involve an additional crossing of the Colorado River, and an increased disturbance to the habitats of threatened and endangered species, including the Yuma clapper rail, bald eagle, peregrine falcon, and desert tortoise. These impacts coupled with an increased cost of $12.6 million (approximately a 30% increase over the portion(s) of the proposed route it would replace and/or require increased pipe diameter) cause this variation to be eliminated under criterion E-4, as identified in Volume II of the FEIR/S.

2.7 INTERRELATIONSHIP WITH OTHER PLANNED OR PROPOSED PROJECTS

(See FEIR/S, I/2.15; II/2.8.)

3.0 AFFECTED ENVIRONMENT

3.1 WYCAL PIPELINE PROPOSAL

3.1.1 Air Quality

Table 3.1-1 in both Volume I and II of the FEIR/S summarizes the federal primary and secondary air quality standards as well as the state standards for pollutants of interest to the proposed projects.

For a general discussion of the Clean Air Act, PSD Review and the New Source Review regulations, see FEIR/S, I/3.1.

The existing air quality conditions along the route proposed for the WyCal pipeline and its variations are described in tables and narrative in the FEIR/S, I/3.1.1, 3.6.1.1, and II/3.1.1. These air quality data were taken from annual summaries published by the air pollution control agencies of each state.

3.1.2 Geology

No significant geologic hazards or other major areas of geologic concern were identified during an aerial reconnaissance of the WyCal route (MP 0-54) conducted in late April, 1988.

See FEIR/S, II/3.1.2 for information on geology (NL 54-501) in the Wyoming Basin, Middle Rocky Mountains, and the Basin and Range.

See FEIR/S, II/3.4.1.2 for information on geology between NL 501 and 605.5.

See FEIR/S, I/3.1.2 for information on geology and faulting across the Mojave Desert and Tehachapi Mountains region of southern California. This reference is appropriate for the Western Leg of the WyCal proposal.

See FEIR/S, I/3.6.1.2 for information on the geologic and physiographic conditions along the El Paso Base Case.

Table 3.1-1 summarizes the geologic and physiographic characteristics of the WyCal route from MP 0-54.4. There are ~~no~~ potentially active or potentially active faults along this segment of the route; however, these faults are relatively minor, with limited extent and magnitude of movement.

Table 3.1-1

GEOLOGICAL AND PHYSIOGRAPHIC CONDITIONS, WYCAL PIPELINE PROPOSAL

	Wyoming Basin NL 0-38	Middle Rocky Mtns. NL 38-54.5
Geologic Unit	Sedimentary rock, alluvium	Sedimentary and igneous rock, alluvium
Age	Eocene	Pennsylvanian to to Tertiary; recent
Topography	Low relief, locally steep banks	Very high relief, very steep slopes, rugged
Comments	Saturated valley floors	Large landslides, faults, avalanches

3.1.3 Soil

The distribution of soil mapping units along the proposed route and the characteristics of individual soils are presented in Appendix A. The introductory comments presented in the FEIR/S, II/3.1.3 also apply to this proposal. See FEIR/S, I/3.1.3, I/3.6.1.3, II/3.1.3, and II/3.4.1.3 for information on soils for the WyCal proposal.

3.1.4 Surface Water

The new WyCal facilities examined in this document would traverse two major drainage basins distributed within two geographic regions. Approximately 5 perennial and 17 intermittent drainage channels would be crossed by this pipeline route from MP 0-54.4. Table 3.1-2 presents information where the WyCal route is different than Kern River's in southwest Wyoming. See FEIR/S, I/3.1.4, I/3.6.1.4, II/3.1.4, and II/3.4.1.4 for additional information concerning the major perennial and intermittent drainage channels that would be crossed by, or are in close proximity to, the remainder of the proposed pipeline route. The exceptions to the referenced sections are that Hams Fork would be crossed near the beginning of the WyCal Northern Leg, and Pleasant Valley Creek and one of its tributaries, both perennial, would be crossed in the Middle Rocky Mountain region of the Wycal route.

Table 3.1-2

MAJOR DRAINAGE CHANNELS IN WYOMING, WYCAL PIPELINE PROPOSAL

Drainage Basin	Drainage Channel	Class 1/ Flow	Sensitivity 2/		Milepost
			Channel Bed	Side slope	
Green River	Roberson Ditch	-	-	-	0.6
	Hams Fork	P	L	L	0.9
	South Side Ditch	-	-	-	1.5
	Dry Muddy Creek (Trib)	I	-	-	4.8
	Coyote Springs Creek	I	-	-	5.6
	Dry Muddy Creek	I	-	-	9.2
	Little Muddy Creek	P	M	L	18.9-19.1
	Little Muddy Creek (Trib)	I	-	-	23.3
	Little Muddy Creek	P	M	M	24.1
	Hill Creek	I	-	-	26.9
	Ryckman Creek (Trib)	I	-	-	30.7
	Ryckman Creek (Trib)	I	-	-	33.8
Bear River	Whitney Canyon Creek	I	-	-	40.6
Green River	Shurtleff	I	-	-	43.5
	Clear Creek (Trib)	I	-	-	45.3
	Clear Creek	I	-	-	46.0
Bear River	Pleasant Valley Ck (Trib)	I	-	-	47.3
	Pleasant Valley Ck (Trib)	I	-	-	47.4
	Pleasant Valley Ck (Trib)	I	-	-	47.8
	Pleasant Valley Ck	P	H	H	49.5
	Pleasant Valley Ck (Trib)	P	H	H	49.6
	Long Hollow	I	-	-	51.2
	Robinson Hollow	I	-	-	51.8
	Duncomb Hollow	I	-	-	54.0

1/ I = intermittent; P = perennial; - = ditch or canal, artificial flow

2/ Channel Bed Gradient: L = low 0-1% M = moderate 1-3% H = high > 3%
Sideslope (topo. slope): L = low 0-5% M = moderate 5-20% H = high > 20%

3.1.5 Groundwater

A description of groundwater conditions through NL 501 of the proposed route is provided in FEIR/S, II/3.1.5. From NL 501-605.5 of the proposed route, groundwater conditions are as described in FEIR/S, II/3.4.1.5. Groundwater conditions along the remainder of the proposed route are as described in FEIR/S, I/3.1.5 and I/3.6.1.5.

3.1.6 Freshwater Biology

Major perennial streams that would be crossed by the WyCal proposal, along with their stream value classifications, are presented in FEIR/S, I/3.1.6, I/3.6.1.6, II/3.1.6, and II/3.4.1.6. Aquatic species of special concern potentially affected by the proposal are listed in the aforementioned sections in the FEIR/S.

The exception to the referenced section is that the Hams Fork, a Class D stream, would be crossed near the beginning of the WyCal Northern Leg (Table 3.1-3). This section of Hams Fork is considered to be a limited value trout fishery. Species that occur within this section of the Hams Fork include primarily nongame fish.

No federally listed or proposed threatened or endangered species or candidates are known to occur along this section of the pipeline route.

3.1.7 Terrestrial Biology

3.1.7.1 Vegetation

See FEIR/S, I/3.1.7.1, I/3.6.1.7, II/3.1.7.1, and II/3.4.1.7.1 for a description of vegetation resources crossed by the Wycal pipeline. Table 3.1-4 presents similar information where the WyCal route is different than Kern River's in southwest Wyoming.

General Vegetation. The WyCal proposal would cross a major wetland adjacent to Hams Fork as well as four minor wetland/riparian areas within the Wyoming Basin. Additional sagebrush scrub and mixed desert scrub communities would also be crossed in the Wyoming Basin. Mountain brush, pinyon-juniper woodland, and sagebrush scrub community types would be crossed by the route in the Middle Rocky Mountain region.

WyCal Maps 1-3 in Vol. IV depict the location of dominant vegetation community types along the portions of pipeline not previously mapped in the Kern River Pipeline proposal. Appendix B lists plant species of special concern that may occur along the project route not previously identified in the FEIR/S and

Table 3.1-3

FISHERY VALUE OF MAJOR PERENNIAL STREAMS IN WYOMING, WYCAL PIPELINE PROPOSAL

State	County	Stream	Approximate Milepost	Fish		State 1/ Classification	BIO/WEST 2/ Classification
				Nongame	Game		
Wyoming Basin Region (NL 0-38)							
Wyoming	Uinta	Hams Fork	0.9	X		4	D
		Little Muddy Creek	18.9-19.1	X		NC	D
		Little Muddy Creek	24.1	X		NC	D
Middle Rocky Mountains Region (NL 38-195)							
Wyoming	Uinta	Pleasant Valley Creek	49.5	X		NC	U
		Pleasant Valley Ck (Trib)	49.6	X		NC	U

1/ Wyoming:
1 High quality waters that are to be maintained at existing quality.
2 Waters that support game fisheries.
3 Waters that support nongame fisheries.
4 Waters that do not support fisheries.

2/ BIO/WEST Stream Classification:
A Stream area containing an excellent game fishery and/or federally listed species. These streams are typically the most highly rated streams in state classifications.
B Stream area containing a high quality game fishery and/or candidate species for federally listed species status or state sensitive species. These streams normally support the bulk of fishing use within a given state.
C Stream areas exhibiting limited or moderate game fisheries. In these waters fishing is considered a secondary use.
D Stream areas with few or no game fish, primarily inhabited by nongame fish. These areas are of no practical value as a fishery resource.
U Stream areas with no fishery resource, typically very small perennial or intermittent streams. These streams are frequently not classified by state agencies.

describes the status and habitat of these species. Legally protected plant species that may occur along previously analyzed portions of the proposed route are listed in the aforementioned sections of the FEIR/S.

Plant Species of Special Concern. ~~A milkvetch (C-2) is the only plant species of special concern expected to occur along the new (MP 0-54.4) route in these regions.~~ Only one Federal candidate species, locoweed, could potentially be impacted by pipeline construction within the Wyoming Basin region.

Table 3.1-4

VEGETATION COMMUNITY TYPES IN WYOMING,
WYCAL PIPELINE PROPOSAL

Geographic Region	Community Type	Milepost
Wyoming Basin	Mixed Desert Scrub	0-1
	Wetland/Riparian	1-2
	Mixed Desert Scrub	2-19
	Wetland/Riparian	19-20
	Mixed Desert Scrub	20-23
	Wetland/Riparian	23-24
	Sagebrush Scrub	24-30
	Wetland/Riparian	30-31
	Sagebrush Scrub	31-33
	Wetland/Riparian	33-34
	Sagebrush Scrub	34-38
Middle Rocky Mtns	Mountain Brush	38-51
	Pinyon-Juniper Woodland	51-54
	Sagebrush Scrub	54-54.5

3.1.7.2 Wildlife

See FEIR/S, I/3.1.7.2, I/3.6.1.7.2, II/3.1.7.2, and II/3.4.1.7.2 for the criteria in determining wildlife species, habitats, and special features of high interest, as well as a description of wildlife resources. Sensitive species ranges and crucial habitat locations were not plotted on strip maps, and specific milepost locations were excluded to avoid potential harassment of sensitive species and their habitats. Table 3.1-5 locates important wildlife features and habitat along the proposed WyCal route in Wyoming where it differs from the proposed Kern River route.

Table 3.1-5

IMPORTANT WILDLIFE HABITAT FEATURES IN WYOMING, WYCAL PIPELINE PROPOSAL

Milepost	Wildlife Concerns
0.8-1.4	Major Sandhill Crane - waterfowl production area
1.7-2.7	Pronghorn Antelope - critical winter range
18.1-19.1	Raptor concentration
18.7-24.1	Pronghorn Antelope - critical winter range
22.4-26.3	Sage Grouse - critical breeding area
23.8-31.8	Mule Deer - critical winter range
24.3-27.7	Raptor concentrations
33.8-39.3	Raptor concentrations

General Wildlife. Raptor species present and potentially present along the proposed route are the same as described in FEIR/S, II/3.1.7.2.1. Nine raptor nests have been identified within one-half mile of the proposed route, and include two golden eagle, three prairie falcon and four red-tailed hawk nests [BLM, 1988; Lanka, 1988]. Additional nests may occur within the analysis corridor, especially within the concentration areas listed in Table 3.1-5.

Important game species and associated high value habitat are similar to those described in FEIR/S, II/3.1.7.2.1. In addition, the floodplain of the Hams Fork has been described as a sandhill crane major production area. Sandhill crane may nest within the wet meadows of other riparian areas such as Ryckman Creek and Little Muddy Creek, but these are not considered major production areas [Luce, 1988]. Waterfowl also nest within these riparian areas, and because available nesting habitat is limited, nesting densities may be relatively high; however, no critical nesting habitat has been defined by Wyoming Game and Fish [Luce, 1988]. Seven sage grouse strutting grounds (leks) have been identified within 1.5 miles of the proposed route [Luce, 1988]. Sage grouse nesting is generally concentrated within two miles of leks, and is considered critical breeding habitat. However, due to topographic relief barriers and more suitable nesting habitat in directions away from the proposed route, only one critical breeding area would be traversed by the proposed route.

Two pronghorn antelope critical winter ranges would be traversed by the proposed route for a total of 6.4 miles. Mule deer critical winter range would be traversed by the proposed route for eight miles.

Common wildlife species, important wildlife species and habitat features for the Anschutz, Black Rock, Henderson, and Topock Compressor Stations are the same as described in FEIR/S II/

3.1.7.2.1 and I/3.1.7.2.2 for the Middle Rocky Mountains, Basin and Range, and Mojave Desert regions respectively.

Wildlife Species of Special Concern. Federally listed species are the same as described in the FEIR/S, II/3.1.7.2.1. For the WyCal project, the USFWS has reaffirmed its previous position in the Biological Opinion for the Kern River and Mojave projects (FEIR/S, II/Appendix G) that should the WyCal (or any other applicant's) pipeline be certificated, it would have to comply with all provisions of their Biological Opinion, including the incidental take portions, in order to be in compliance with the Endangered Species Act. These provisions were adopted by staff as mitigation measures in Vol. III of the FEIR/S. WyCal has also stated that they will adopt these measures as they apply to species of special concern. Approximately 640 acres of potential black-footed ferret habitat (white-tailed prairie dog colonies) have been identified within the analysis corridor [Lanka, 1988]. Bald eagles winter along the east side of the Bear River Divide and forage at open water areas of the Bear River. Known winter roost sites and concentration areas occur at the Crawford Mountains and the Woodruff Narrows of the Bear River. Bald eagle concentrations and foraging areas are more than six miles from the proposed route [Taylor, 1988].

Federally listed candidates are the same as described in FEIR/S, II/3.1.7.2.1 (ferruginous and Swainson's hawks). No nests have been identified within the analysis corridor.

Species of special concern for the above mentioned compressor stations are the same as described in the FEIR/S, II/3.1.7.2.1 and I/3.1.7.2.2 for the Middle Rocky Mountains, Basin and Range, and Mojave Desert regions respectively.

3.1.7.3 Grazing

See FEIR/S, I/3.1.7.3, I/3.6.1.7.3, II/3.1.7.3, and II/3.4.1.7.3. Detailed information on grazing allotments traversed by the proposed alignment in Wyoming is presented in Appendix C.

3.1.8 Socioeconomics

The study area includes 16 counties in five states: two in Wyoming, nine in Utah, two in Nevada, two in California, and one in Arizona. The following sections rely extensively on the FEIR/S, I/3.1.8, I/3.6.1.8, and II/3.1.8.

3.1.8.1 Population, Housing, and Economic Characteristics

3.1.8.1.1 Wyoming

The proposed WyCal project will affect two counties in Wyoming, Lincoln and Uinta. Pipeline will be constructed in both counties, and a 10,600 hp compressor station is proposed for Uinta County. Socioeconomic profiles of these counties may be found in FEIR/S, II/3.1.8.1.1. The towns of Evanston in Uinta County, Kemmerer in Lincoln County, and Green River and Rock Springs in adjacent Sweetwater County are also profiled in this section of the FEIR/S. Profiles of Green River and Rock Springs are provided because, while they are not in the specific counties where the construction will occur, they are close enough to the project that some of the construction workers may stay there and various purchases of goods and services may also occur there.

3.1.8.1.2 Utah

The proposed WyCal project will traverse nine counties in Utah. In all counties pipeline construction is proposed and in Millard County a 10,600 hp compressor is also planned. The FEIR/S, II/3.1.8.1.2 provides profiles of these counties and the appropriate cities.

3.1.8.1.3 Nevada

WyCal proposes to traverse Lincoln and Clark counties and build a 15,900 hp compressor station near Henderson in Clark County. Neither county has a major socioeconomic infrastructure as indicated by profiles presented in FEIR/S, II/3.1.8.1.3. The notable exception is the part of Clark County that includes Las Vegas which has a significant infrastructure. Both Las Vegas and Henderson are profiled in the aforementioned section of the FEIS.

~~Given the route of the WyCal proposal, as it differs from the Kern River and Mojave proposed pipelines, one area of Clark County that may be affected is the Laughlin area. Laughlin is an unincorporated section of Clark County and is governed by the County government. In recent years, the Laughlin area has grown dramatically due to construction, and anticipated construction, of several casinos. Present estimates indicate that the Laughlin area has 2,000 to 3,000 full time residents. However, beyond the casinos, most of the local infrastructure is found across the River in the Riviera - Bullhead City, Arizona area. This area is profiled in Section 3.1.8.1.5. (Source: personal communication, Clyde Wyker, Principal Planner, Bullhead City, Arizona, May 10, 1988).~~

3.1.8.1.4 California

Two counties, San Bernardino and Kern, are the proposed construction sites for components of the WyCal project. Both counties are profiled in FEIR/S, I/3.1.8.1.2, as are the cities and towns of Bakersfield, Barstow, Needles, and Victorville. Bakersfield, in particular, is a city whose economy is in large part driven by the oil and gas industry.

3.1.8.1.5 Arizona

A 15,900 hp compressor station and 17 miles of pipeline are proposed to be placed in Mohave County. Section FEIR/S, I/3.1.8.1.1 presents a detailed profile of Mohave County. The town of Kingman and Lake Havasu City in Mohave County also are profiled.

~~One city that was not included in the FEIR/S that could be affected by the WyCal project is the Riviera - Bullhead City area, which has grown in recent years due to the development of the casinos in nearby Laughlin, Nevada, and the movement of retired persons to the area. The Riviera - Bullhead City area currently has an estimated population of 21,000, more than double the 10,364 residents counted in the 1980 Census. The forecasted population for 1995 is 30,510 persons. In 1985, this area had 11,347 dwelling units with an average household size of 2.3 persons. Many of the dwelling units are mobile homes and second homes, and the implied vacancy rate of 19.5 percent reflects the high vacancy levels. There are an estimated 1,000 motel rooms in the City at this time. This number is expected to double by the year 2000. (Source: personal communication, Clyde Wyker, Principal Planner, Bullhead City, Arizona, May 10, 1988).~~

See FEIR/S, I/3.6.1.8.1 for information on Apache and Navajo Counties in Arizona.

3.1.8.2 Traffic

The 54.5 new miles of the WyCal Mainline in Wyoming will cross two U.S. routes (U.S. 189 and 30N), one railroad (Union Pacific), one Interstate route (I-80), two state roads (Wy 150 and 412), and three local and county roads. Numerous jeep trails would also be crossed.

Refer to FEIR/S, II/3.1.8.2 and II/3.4.1.8.1, and I/3.1.8.2 and I/3.6.1.8.2 for traffic information along the Kern River, East Las Vegas, and Mojave routes, including the Mojave Transfer Line and El Paso's Base Case.

Access for the majority of this route can be easily accommodated by the numerous unimproved roads and existing pipeline corridors

(NL .1 to NL 2.3) in close vicinity of the proposed pipeline. For approximately 23 miles the proposed route follows closely the ROW of existing unimproved roads and zigzags these roads multiple times.

The proposed Mainline route crosses two historic trails. At NL .7 the Hams Fork Cutoff trail is crossed and the route crosses the Oregon (Emigrant Trail) and possibly some of its cutoffs and side trails near NL 24. At this latter crossing, the trail has an USGS unimproved road status as opposed to the trail status.

3.1.8.3 Noise

Ambient noise levels for the pipeline corridor were not measured specifically for this project analysis. FEIR/S, I/3.1.8.3, I/3.6.1.8.3, II/3.1.8.3, and II/3.4.1.8.2 provide information on project ambient noise levels along the Kern River and Mojave routes, and the East Las Vegas route alternative.

Recent sound surveys of the proposed Henderson Compressor Station have been modeled to a distance of two kilometers from the proposed station location utilizing the AGASOUND noise modeling program. These data represent three Solar Centaur Type-H natural gas-fired turbine compressors rated at 5,300 hp each.

Calculated noise levels potentially emitted from the station were as follows for a number of distances from the station: 400 meters-51 dBA; 1,000 meters-41 dBA; 2,000 meters-33 dBA. The nearest noise sensitive receptor in the area is a house located approximately 470 meters west of the station site. The calculated noise impact at this site assuming flat terrain is 49 dBA. Projected noise levels would be less considering an intervening ridge between the station and the house.

The Topock Station has been previously modeled in FEIR/S, I/3.1.8.3 for the Mojave Project. Noise impacts were recalculated at this station taking into account that less horsepower of compression would be necessary (15,900 WyCal vs. 22,500 hp Mojave). Calculated noise levels were similar to those discussed for the Henderson Station.

3.1.8.4 Recreational Resources

There are no designated recreational resource facilities occurring along the 55 miles of WyCal Mainline in Wyoming. Refer to FEIR/S, II/3.1.8.4, II/3.4.1.8.3, I/3.1.8.4, and I/3.6.1.8.4 for recreational resources which occur on the Kern River, East Las Vegas, and Mojave proposed routes, including the Mojave Transfer Line and El Paso's Base Case.

Dispersed recreational opportunities do exist within the mile-wide study corridor. These recreational activities include hunting, fishing, hiking, camping, snowmobiling, picnicking, and ORV use. Deer and elk hunting and related activities, such as ORV use and camping, are the most widely practiced recreational pursuits [BLM, 1985].

The pipeline crosses two areas of medium-level recreation development potential as designated by the Bureau of Land Management. These areas occur between NL 0 and 3 near the crossing of Hams Fork and between NL 15 and 21 in the vicinity of Muddy Creek.

The proposed Mainline route crosses two historic trails. At NL 0.7 the Hams Fork Cutoff trail is crossed and the route crosses the Oregon (Emigrant Trail) and possibly some of its cutoffs and side trails near NL 24. The Hams Fork Cutoff lies within one of the areas of medium-level recreation potential. Potential for hiking and backpacking along emigrant trails and cutoffs is high.

3.1.9 Land Ownership/Use

The introductory paragraphs to FEIR/S, I/3.1.9 discuss land ownership entities, land use categories, and Forest Service Land and Resources Management Plans and Plan Amendments in general. A detailed discussion of Forest Service Land and Management Plans in Utah is found in FEIR/S, II/Appendix F.

Land ownership in Wyoming is shown in Table 3.1-6. Table 3.1-7 shows land use by county. The reader is referred to FEIR/S, I/Table 3.1-20 and II/Table 3.1-24 for a synopsis of applicable policies or requirements for federal, state, and local agencies.

Table 3.1-6

LAND OWNERSHIP IN WYOMING, WYCAL PIPELINE PROPOSAL

		Private		BLM		State	
County	Total	Miles	%	Miles	%	Miles	%
Lincoln	20.4	11.2	(55)	8.4	(41)	0.8	(3)
Uinta	34.2	25.3	(74)	7.7	(22)	1.2	(4)
Total	54.6	36.5	[66]	16.1	[30]	2.0	[4]

Table 3.1-7

LAND USE IN WYOMING, WYCAL PIPELINE PROPOSAL

County	Total Miles Traversed	Grazing/ Rangeland Miles	%	Irrigated/ Non-Irrigated Agriculture Miles	%
Lincoln	20.4	19.4	(95)	1.0	(5)
Uinta	34.2	34.2	(100)	-	-
Total	54.6	53.6	[98]	1.0	[1]

Within both Lincoln and Uinta Counties in Wyoming, the majority of the land along the pipeline corridor is currently used for grazing and rangeland. Lincoln County's planning/zoning regulations require natural gas pipelines to obtain a conditional use permit prior to beginning construction. Uinta County's comprehensive plan has a general policy which states that "... natural gas and other utility facilities should be located and coordinated in a manner that will help ~~reserve~~ preserve the natural and man-made environment." The BLM Resource Management Plan for the Kemmerer, Wyoming Resource Area [1986] states that all public lands within the resource area have been reviewed and determined to be suitable for oil and gas leasing and development subject to certain stipulations, primarily pertaining to exploration and not to production operations.

The existing environment discussion in FEIR/S, II/3.1.9.1 is applicable to the portion of the proposed WyCal route from NL 54 to NL 501 which follows the Kern River route through Wyoming, Utah, and into Nevada (Kern River MP 49 to 491).

The segment of the WyCal route from NL 501 to NL 605 follows the proposed East Las Vegas Variation to the Kern River route. The existing land use environment for this area is discussed in FEIR/S, II/3.4.1.9. This route passes through Henderson, Nevada. Land uses along the route include five acres of residential uses in Nevada, with the remainder being devoted to grazing and rangeland.

Land uses and policy issues along the Western Leg of the WyCal route are the same as those discussed in FEIR/S, I/3.1.9 for the Mojave pipeline route. Land uses include grazing/rangeland, agriculture, commercial/industrial, residential, recreation, and military uses.

Land uses and policy issues for the El Paso Base Case are the same as those discussed in FEIR/S, I/3.6.1.9). Land use along this route is grazing/rangeland.

3.1.10 Cultural Resources

3.1.10.1 Archaeology

The cultural resource data for new segments of the WyCal Pipeline Proposal and its variations were compiled from existing data drawn from previous block sample surveys, such as the BLM Kemmerer Resource Area and BLM Overthrust studies, and from previous gas, oil, power, communication, and roading studies, such as the Mapco Pipeline Project. For those sections lacking documentation, a complete Class I inventory was implemented for the mile-wide pipeline corridor.

In order to update previously existing inventories of cultural resources and to prepare new ones for undocumented pipeline segments, the records of the various regional clearinghouses, SHPOs, BLM offices, and Forest Service office for new areas along the project mainline and variations corridors were consulted. The resulting data are current as of May, 1988.

For areas of the proposed WyCal corridors previously studied as part of the Kern River, Mojave, Transwestern, and El Paso proposals (see FEIR/S I and II), data are current as of April, 1986.

Data recording and analysis procedures employed in the study of WyCal's proposed new segments were fully consistent with those employed in the earlier assessments of the Kern River and other proposals. These procedures are fully discussed in the FEIR/S, I and II and are detailed at length in the companion Cultural Resources Technical Report [de Barros, 1987].

In the new WyCal segment in Wyoming, one site is listed on the National Register of Historic Places (NRHP) (Cumberland National Register District). This district contains several historic coal mines and mining towns, as well as prehistoric sites. Also encountered in the Cumberland Gap area and to the west (in the Bear River Divide area) are several segments of the Oregon Trail and its branches, the Hams Fork and Black's Fork Cutoffs. Two segments of these trails have been determined eligible for NRHP status; if they prove to have integrity where they are crossed by the pipeline corridor, they would be added to existing listed segments as NRHP-eligible locations. Four sites have been determined ineligible and 59 sites have an undetermined status.

Cultural resource data for the WyCal project are based on the data presented in some detail in the Cultural Resources Technical Report [de Barros, 1987]. Details on past survey coverage and an overview of the prehistory, history and ethnohistory of the project area are also contained in the technical report. To protect cultural resource localities from unauthorized collecting, this report will be made available only to qualified investigators.

Summary

The WyCal Wyoming new route (NL 0-54.4) roughly approximates the Kern River route for a portion of its length; it was however, fully re-evaluated. Close to 75 survey and other study segments have been examined within or partially within the analysis corridor. These studies covered approximately 10.7 miles (20%) of construction ROW. Another 29.5 miles of survey were directly adjacent to (and perhaps partly covered) the ROW. A total of at least 65 sites or historic trail segments have been documented within the analysis corridor; an additional four sites appear to represent multiple site numbers for sites which lie across county lines and hence were documented under more than one Smithsonian number. The documented sites include 23 historic sites or components, 47 prehistoric sites or components, and four sites of unknown time period. Of these sites, one is a listed National Register Historic District and prehistoric components of two more have been determined eligible for listing. Additional eligible segments of the Oregon Trail are suspected within the analysis corridor. Data on the remaining portions of the route have been presented in FEIR/S, I/3.1.10.1, 3.6.1.10.1, II/3.1.10 and 3.4.1.10.1.

The cultural resources situated in the mile-wide mainline corridor are presented in Table 3.1-8.

Proposed New Compressor, Metering, and Microwave Stations

A prehistoric and a historic/prehistoric site lies within the impact area of the Hams Fork Metering Station; these sites have been previously evaluated by several studies and have been impacted but may still retain significance. Two surveys have been carried out within the study corridor of the proposed Anschutz Compressor Station; no sites were reported. The area within and to the north of the Henderson Compressor Station has been fully inventoried by two studies; a historic dump and a prehistoric site are recorded. The Black Rock Compressor Station study corridor has not been surveyed; no sites are known.

Of the 24 proposed microwave stations, five are placed within metering or compressor stations, 14 are in existing microwave station locations, and two were studied in the Kern River proposal. Of the remaining three, two lie on apparently uninventoried private land, and the third, a proposed New York Mountains Station has a historic mining site and two Native American (prehistoric?) sites are outside the zone of impact but within the study corridor. Precise plans for the placement of this station are not available at this time, rendering probable impact assessment difficult.

Table 3.1-8

KNOWN CULTURAL RESOURCE TYPES IN WYOMING, WYCAL PIPELINE PROPOSAL

Type	Number
Habitation	4
Campsite	4(1) 1/
Camp+Hearth	5
Scatters	
Lithic	9(4)
Groundstone	1
Lithic+Fire altered rock	4
Lithic+hearth	3
Lithic+Groundstone	1
Fire altered rock	2
Features	
Quarry	5(1)
Tipi Ring	2
Hearth(s)	1
Historic Features	
Historic Trash	7(2)
Historic Sheep Camp	3
Mining Site	4
Town	1
Trail	3
Ranch	1
Homestead	1
Historic	1
Unknown	4
TOTAL	66

1/ Figures in parentheses refer to additional instances occurring at sites which have already been counted once in the table.

3.1.10.2 American Indian Concerns

Procedures used to document American Indian concerns in previous volumes of this study were followed for new or varying segments of the WyCal proposal. For discussion of those portions of the WyCal mainline which follow previously analyzed segments of the Kern River, Mojave, or other proposed alignments, please refer to FEIR/S, I and II.

The only portion of the proposed WyCal mainline which deviates substantially from previously studied alignments is the initial Wyoming reach (Opal to I-80). This segment does not pass through any American Indian lands. It, like the Kern River Wyoming section, does pass through traditional lands of the Ute Indian tribe (Ute Tribal Museum, Fort Duchesne, Utah), who have expressed concerns already discussed in FEIR/S, II/3.1.10.2.

3.1.11 Paleontological Resources

See FEIR/S, I/3.1.11, I/3.6.1.11, II/3.1.11, and II/3.4.1.11 for a discussion of methods information sources, and importance criteria. Table 3.1-9 identifies the significant formations along the WyCal Mainline route corridor in Wyoming.

3.1.12 Visual Resources

The scenic resources along the 54.4 mile segment of the WyCal pipeline in Wyoming are quite similar to those along the portion of the Kern River pipeline which it replaces. ~~The environment is generally characterized by subalpine and coniferous forest vegetation with scattered areas of aspens, oaks, and maples. Predominant landforms include steep mountain peaks, ridgelines, and foothill transition areas.~~ Primary colorations are greens and grays, with textures ranging from medium to coarse. This segment traverses the Kemmerer Resource Management Area.

MP 0-1, VRM/VQO: BLM Class II
Description: Hams Fork Bottomland, Kemmerer Resource Area. Landform in this area is basically flat with a meandering streambed. Vegetation ranges from riparian species along the edges of the stream to scrub and sage vegetation further from the streambed. Green is the predominant color, with textures ranging from fine to coarse. Modifications in the area include a pumping station, a pipeline, a highway, and a radar tower.

MP 1-50, VRM/VQO: BLM Class III and IV
Description: Kemmerer Resource Area. Landforms in the area vary from flats to ridges to canyons, streambeds, and hills or buttes. Vegetation includes sage and scrub species, as well as grasslands and juniper woodland. While greens predominate, there are some patches of browns and greys. Textures range from fine to coarse.

Table 3.1-9

PALEONTOLOGICAL FORMATIONS, WYCAL PIPELINE PROPOSAL

Age	Formation	Potential 1/ Vertebrate/ Invertebrate	Sensitivity
	Wycal Wyoming		
Eocene	Bridger Formation	H/L	Yes
Quaternary	Quaternary Alluvium	L/L	No
Eocene	Wasatch Formation	H/L	Yes
Eocene	Green River Formation (Laney Member)	H/H	Yes
Eocene	Green River Formation (Wilkins Peak Member)	H/H	Yes
Eocene	Green River Formation Wasatch Formation (Undivided)	H/H	Yes
Cretaceous	Aspen Shale	M/H	No
Cretaceous	Gannet Group	L/L	No
Cretaceous	Frontier Formation	H/H	Yes
Cretaceous	Hilliard Shale	L/H	No
Certaceous/Paleocene	Evanston Formation	H/H	Yes

1/ L = Low, M = Moderate, H = High

Source: Morales, et al. [1987]

Modifications to the area include agricultural uses, paved and unpaved roads, and pipelines.

MP 50-54, VRM/VQO: BLM Class III (A)
Description: Kemmerer Resource Area. Landforms in this area are characterized by several hollows which cross the pipeline corridor. Vegetation in this area is primarily sagebrush and grass, with a small patch of riparian vegetation within one hollow. There are no specific modifications to the area, with the exception of the Interstate along the southern boundary. This road offers scenic views into this area.

The scenic environment for the segment of the WyCal Pipeline from NL 54.4 to NL 501 is the same as that addressed in FEIR/S, II/3.1.12.2 for the Kern River mainline. The reader is referred to the FEIR/S, II/3.4.1.12 for a discussion of the scenic environment of the proposed WyCal pipeline from NL 501 to NL 605, which follows the East Las Vegas Variation for the Kern River pipeline through the Rainbow Gardens and the Sunrise Mountain Instant Study Area.

The affected scenic environment for the Western Leg and El Paso's Base Case of the WyCal pipeline is the same as that addressed in the FEIR/S, I/3.1.12 and I/3.6.1.12.

3.2 WYCAL ROUTE VARIATIONS

3.2.1 Wasatch Variation Alternatives

Due to concerns expressed by the Cities of Bountiful, North Salt Lake, and West Valley City, and the Bountiful Hills Residents and Concerned Citizens, a small portion of the Wasatch Variation between MP 38 and 50 of the variation has been extensively reviewed. Information on the Wasatch Variation Affected Environment is presented in FEIR/S, II/3.3.1. The alternatives presented below represent routing changes which are being examined to determine if the alternatives would alleviate some of their concerns.

3.2.1.1 Air Quality

See Section 3.1.1 and Tables 3.1-1 and 3.1-2 for baseline information applicable to the three alternatives.

3.2.1.2 Geology

Table 3.2-1 summarizes the geologic and physiographic characteristics of the three alternatives.

Table 3.2-1

GEOLOGIC AND PHYSIOGRAPHIC CONDITIONS, WASATCH VARIATION ALTERNATIVES

Location	Geol/Phys Province	Geologic Unit	Age	Topography	Comments
		Bountiful Boulevard Alternative			
Chalk Creek to Bountiful (BB 39.6-46.3)	Middle Rocky Mtns	Sedimentary rock, volcanics; alluvium	Precambrian to Tertiary; recent	Very high relief, rugged, very steep slopes	Landslides, stream crossings
		Pages Lane Alternative			
Chalk Creek to Bountiful (PL 39.6-43.5)	Middle Rocky Mtns	Sedimentary rock, volcanics; alluvium	Precambrian to Tertiary; recent	Very high relief, rugged, very steep slopes	Landslides, stream crossings
Bountiful to Scipio (PL 43.5-53.3)	Basin & Range	Sedimentary and igneous rock; lacustrine, alluvium; volcanics	Pennsylvanian to Tertiary; recent	Low to moderate relief, locally steep slopes	Liquefaction, stream crossings
		Bountiful Peak Alternative			
Chalk Creek to Bountiful (BP 38.5-47.5)	Middle Rocky Mtns	Sedimentary rock, volcanics; alluvium	Precambrian to Tertiary; recent	Very high relief, rugged, very steep slopes	Landslides, stream crossings
Bountiful to Scipio (BP 47.5-58)	Basin & Range	Sedimentary and igneous rock; lacustrine, alluvium; volcanics	Pennsylvanian to Tertiary; recent	Low to moderate relief, locally steep slopes	Liquefaction, stream crossings

3.2.1.2.1 Bountiful Boulevard Alternative

The Bountiful Boulevard Alternative would follow a narrow ridgeline to the Salt Lake Valley. At BB 43.5 the route turns to the south-southwest and follows the contour (5,200 ft) along the upper bench of Lake Bonneville. This variation is located in an area that has not had significant slope stability problems in the past. However, it crosses three drainages which have had slope stability problems in the higher portions of their watershed. This alternative would cross the Warm Springs segment of the Wasatch Fault near BB 46.3. There is extensive slumping in the SE 1/4, Section 21, ~~T21N~~ T2N, R1E, within the designated Ward Canyon Corridor.

See FEIR/S, II/3.3.1.2 for further information on geology along the remainder of this proposed variation.

3.2.1.2.2 Pages Lane Alternative

The Pages Lane Alternative would proceed west from PL 39.6, down a relatively narrow ridgeline to the Salt Lake Valley. This route follows an existing pipeline with no apparent signs of slope stability or other geologic hazards having affected the pipeline. The Pages Lane variation would cross the Wasatch Fault near PL 43.5. There is extensive slumping in the SE 1/4, Section 21, T21N, R1E, within the designated Ward Canyon Corridor. See FEIR/S, II/3.3.1.2 for detailed information on geology for the remainder of this proposed variation.

3.2.1.2.3 Bountiful Peak Alternative

See FEIR/S, II/3.3.1.2 for detailed information on geology in the Middle Rocky Mountains and Basin and Range.

The Bountiful Peak Alternative proposed route utilizes ridgelines to cross the Wasatch Front. From BP 38.5 to Bountiful Peak the proposed route would parallel or be within the ROW of an existing road. Shallow soils overly sedimentary bedrock and no signs of instability were observed on this section of the proposed route. This variation would cross the Wasatch Fault near BP 47.5.

Downslope from Bountiful Peak to the Salt Lake Valley the proposed route follows a broad-shouldered ridgeline between Ford Canyon and Steed Creek. This ridge is a very large paleo-landslide with zones of mass instability evidenced by numerous slumps and debris slides on the ridge and in the canyons. ~~The Forest Service have observed that there is evidence of numerous slumps and debris slides on the ridgeline from Bountiful Peak to the valley floor within the analysis corridor. There are also numerous slumps in the canyons and major/minor draws.~~

3.2.1.3 Soil

3.2.1.3.1 Bountiful Boulevard Alternative

The distribution of soil mapping units along this route variation and the characteristics of individual soils are presented in Appendix A. See FEIR/S, II/3.3.1.3.1 and 3.3.1.3.2 for information on soils for the remaining portions of the route.

3.2.1.3.2 Pages Lane Alternative

The distribution of soil mapping units along this route variation and the characteristics of individual soils are presented in Appendix A. See FEIR/S, II/3.3.1.3.1 and 3.3.1.3.2 for information on soils for the remaining portions of the route.

3.2.1.3.3 Bountiful Peak Alternative

The distribution of soil mapping units along this route variation and the characteristics of individual soils are presented in Appendix A. See FEIR/S, II/3.3.1.3.1 and 3.3.1.3.2 for information on soils for the remaining portions of the route.

3.2.1.4 Surface Water

3.2.1.4.1 Bountiful Boulevard Alternative

See FEIR/S, II/3.3.1.4 for a description of water resources along portions of this variation common to the Kern River Wasatch Variation. This alternative would traverse two perennial and five intermittent drainages. Table 3.2-2 lists the major perennial and intermittent drainages crossed by, or in close proximity to, the alternative route. Of particular note are Holbrook Canyon and Mill Creek which are municipal watersheds for Bountiful City; only Holbrook Canyon watershed would be affected.

3.2.1.4.2 Pages Lane Alternative

See FEIR/S, II/3.3.1.4 for a description of water resources along portions of this variation common to the Kern River Wasatch Variation. This alternative would traverse two perennial and four intermittent drainages. Table 3.2-2 lists the major perennial and intermittent drainage channels crossed by, or in close proximity to, the alternative route. Holbrook Canyon is a proposed municipal watershed.

Table 3.2-2

MAJOR DRAINAGE CHANNELS, WASATCH VARIATION ALTERNATIVES

			Sensitivity 2/		
Drainage Basin	Drainage Channel	Class1/ Flow	Channel Bed	Side slope	Mile-post
	Bountiful Boulevard Alternative				
Great Salt Lake Basin	Holbrook Canyon	P	H	H	42.7
	Unnamed	I	-	-	42.9
	Mill Creek	P	H	H	43.3
	Unnamed	I	-	-	43.9
	Unnamed	I	-	-	44.2
	North Canyon	I	-	-	44.9
	Hooper Canyon	I	-	-	45.4
	Pages Lane Alternative				
Great Salt Lake Basin	Stone Creek	P	H	H	42.6
	Unnamed	I	-	-	42.9
	Unnamed	I	-	-	43.3
	Unnamed	I	-	-	47.2
Jordan River	Jordan River	P	L	L	51.0
	Rudy Drain	I	-	-	52.2
	Bountiful Peak Alternative				
Great Salt Lake Basin	Unnamed	I	-	-	47.5
	Unnamed	I	-	-	48.8
	Unnamed	I	-	-	49.8
Jordan River	Jordan River	P	L	L	53.6
	Rudy Drain	I	-	-	54.8

1/ I = intermittent, P = perennial,
- = ditch or canal, artificial flow

2/ Sensitivity: Channel Bed Gradient
L = Low 0-1% M = Moderate 1-3 % H = High > 3%
Sideslope (topographic slope)
L = Low 0-5% M = Moderate 5-20% H = High > 20%

3.2.1.4.3 Bountiful Peak Alternative

See FEIR/S, II/3.3.1.4 for a description of water resources along portions of this variation common to the Kern River Wasatch Variation. This alternative would traverse one perennial and four intermittent drainages. Table 3.2-2 lists the major perennial and intermittent drainage channels crossed by, or in close proximity to, the alternative route. This alternative would cross the extreme upper reach of several canyons important as municipal watersheds.

3.2.1.5 Groundwater

Bountiful Boulevard, Pages Lane, and Bountiful Peak Alternatives

Groundwater conditions within the mountainous portion of ~~the Wasatch Variation~~ these variations (BB 39.6-46.3, PL 39.6-43.8, and BP 38.5-47.5) are generally as described in FEIR/S, II/Table 3.1-8 for MP 80-180. Within the Salt Lake Valley portions of these variations, (PL 43.8-53.3 and BP 47.5-58.4), the depth to groundwater is typically less than approximately 10 feet. The total dissolved solids concentration of this shallow groundwater is generally in excess of 1000 milligrams per liter and the permeability of the saturated materials is low, minimizing the beneficial use of the water.

3.2.1.6 Freshwater Biology

Bountiful Boulevard, Pages Lane, and Bountiful Peak Alternatives

General Freshwater Biology. See FEIR/S, II/3.3.1.6 for a description of fishery resources along portions of this variation common to the Kern River Wasatch Variation. The major perennial streams that would be crossed by these alternatives are presented in Table 3.2-3 along with their stream value classifications.

Aquatic Species of Special Concern. No state or federally listed or proposed species of special concern occur along this segment of the pipeline route.

3.2.1.7 Terrestrial Biology

3.2.1.7.1 Vegetation

For a description of vegetation community types present along areas of the variation common to the Kern River Wasatch Variation, see FEIR/S, II/3.3.1.1.7. Table 3.2-4 lists vegetation community types present along each of the proposed alternatives. Descriptions of vegetation community types may be found in FEIR/S, II/Appendix B.

Table 3.2-3

FISHERY VALUE OF MAJOR PERENNIAL STREAMS, WASATCH VARIATION ALTERNATIVES

State/ County	Stream	Approximate Milepost	Fish Nongame	Fish Game	State 1/ Classification	BIO/WEST 2/ Classification
		Bountiful Boulevard Alternative				
Middle Rocky Mountains (BB 39.6-46.3)						
Davis	Holbrook Canyon	42.7	-	X	h-cw-3	B
	Mill Creek	43.3	-	X	h-cw-3	B
		Pages Lane Alternative				
Middle Rocky Mountain (PL 39.6-53.3)						
Davis	Stone Creek	42.6	-	X	h-cw-3	B
Basin and Range (PL 43.5-155)						
Davis/Salt Lake	Jordan River	51.0	X	X	1-ww-5	D
		Bountiful Peak Alternative				
Basin and Range (BP 47.5-159.6)						
Davis/Salt Lake	Jordan River	53.6	X	X	1-ww-5	D

1/ Utah: The first letter (c) identifies one of the four use area rankings--c, critical; h, high priority; s, substantial value. The second group of letters (cw) identifies the primary type of fishery for which water is managed--cw, cold water fishery; ww, warm water fishery; ng, nongame fishery. The first number identifies one of the six stream classifications for the Utah State's fishery classification scheme, with 1 being the highest and 6 the lowest.

2/ BIO/WEST Stream Classification:

A Stream area containing an excellent game fishery and/or federally listed species. These streams are typically the most highly rated streams in state classifications.

B Stream area containing a high quality game fishery and/or candidate species for federally listed species status or state sensitive species. These streams normally support the bulk of fishing use within a given state.

C Stream areas exhibiting limited or moderate game fisheries. In these waters fishing is considered a secondary use.

D Stream areas with few or no game fish, primarily inhabited by nongame fish. These areas are of no practical value as a fishery resource.

U Stream areas with no fishery resource, typically very small perennial or intermittent streams. These streams are frequently not classified by state agencies.

Table 3.2-4

VEGETATION COMMUNITY TYPES,
WASATCH VARIATION ALTERNATIVES

Geographic Region	Community Type	Milepost
Bountiful Boulevard		
Middle Rocky Mtns	Mountain Brush	39.6-43
	Wetland/Riparian	43
	Mountain Brush	43.0-43.8
	Wetland/Riparian	43.8
	Mountain Brush	43.8-45.4
	Wetland/Riparian	45.5
	Mountain Brush	45.4-46.5
Pages Lane		
Middle Rocky Mtns	Mountain Brush	39.6-43
Basin and Range	Urban	43-46
	Agricultural Land	46-50
	Wetland/Riparian	50-53.3
Bountiful Peak		
Middle Rocky Mtns	Montane Forest	38.5-39
	Mountain Brush	39-40
	Montane Forest	40-41
	Mountain Brush	41-47
Basin and Range	Agricultural Land	47-55
	Wetland/Riparian	55-58.4

Bountiful Boulevard Alternative (BB 39.6-46.3)

General Vegetation. Mountain brush, as described in Appendix B of the FEIR/S, II, dominates the portion of this alternative (BB 39.6-46.5) not addressed in the Kern River document. Small areas of riparian vegetation occur flanking streams.

Plant Species of Special Concern. No federally listed or proposed, candidate, state protected, or state sensitive species along this alternative [England, 1988].

Pages Lane Alternative (PL 39.6-53.4)

General Vegetation. Mountain brush, agricultural land, and wetland/riparian community types dominate along this alternative. These community types are described in the FEIR/S, II/Appendix B.

Plant Species of Special Concern. No federally listed or proposed, candidate, state protected, or state sensitive species occur along this alternative [England, 1988].

Bountiful Peak Alternative (BP 38.5-58.0)

General Vegetation. Primarily montane forest and mountain brush vegetation community types would be traversed by this alternative, although some areas of agricultural land or riparian vegetation would be crossed. These vegetation types are described in FEIR/S, II/Appendix B.

Plant Species of Special Concern. No federally listed or proposed, candidate, state protected, or state sensitive species occur along this alternative [England, 1988].

3.2.1.7.2 Wildlife

Wildlife concerns and distributions within the analysis corridor have been identified from information provided by the Utah Division of Wildlife Resources, Northern Region.

Bountiful Boulevard Alternative (BB 39.6-46.3)

The critical winter range of the mule deer is the only major wildlife habitat crossed by this alternative from BB 43.7-44.5.

General Wildlife. Important wildlife species and habitats are described in FEIR/S, II/3.3.1.7.2. An additional 0.8 miles of mule deer critical winter range is traversed by this proposed variation along the Wasatch Front, and another two miles lie within the analysis corridor.

Wildlife Species of Special Concern. Species of special concern and their distributions are described in FEIR/S, II/3.3.1.7.2. One peregrine falcon hack site exists within 0.5 miles of the proposed ROW southwest of Bountiful, Utah. In 1987, this hack site fledged four peregrines. In 1988, ravens nested on the hack tower. Another hack site exists on Antelope Island, and others occur greater than 15 miles north of the proposed alignment along the eastern marshes of the Great Salt Lake. Hack sites provide suitable nesting platforms for returning peregrines. Three peregrine pairs successfully nested and produced young along the eastern edge of Great Salt Lake during 1988. Additionally, the celebrated pair in downtown Salt Lake City again successfully produced three young. No active aeries exist within the analysis corridor, but the proposed ROW traverses approximately 20 miles of peregrine hunting range associated with active nests. This information concerning peregrine falcons is new information since the FEIR/S was published and would apply to the Wasatch Variation as well.

Pages Lane Alternative (PL 39.6-53.4)

General Wildlife. Important wildlife species and habitats are described in FEIR/S, II/3.3.1.7.2. An additional 0.5 miles of mule deer critical winter range (PL 43.7-44.2) is traversed by this proposed variation along the Wasatch Front, and another one mile lies within the analysis corridor.

Wildlife Species of Special Concern. Species of special concern and their distributions are described in FEIR/S, II/3.3.1.7.2. In addition, the description for peregrine distribution and use within this area of concern is the same as discussed previously for the Bountiful Boulevard Alternative.

Bountiful Peak Alternative (BP 38.5-58.4)

General Wildlife. Important wildlife species and habitats are described in FEIR/S, II/3.3.1.7.2. An additional 0.5 miles of mule deer critical winter range (BP 47.2-47.5) is traversed by this proposed variation along the Wasatch Front, and another 0.9 miles lies within the analysis corridor.

Wildlife Species of Special Concern. Species of special concern and their distributions are described in FEIR/S, II/3.3.1.7.2. In addition, three bald eagle winter concentration areas occur within the analysis corridor for a total of 8.2 miles. The proposed ROW would not traverse these concentration areas. The description for peregrine distribution and use within this area of concern is the same as discussed for the Bountiful Boulevard Alternative.

3.2.1.7.3 Grazing

Bountiful Boulevard Alternative

A narrative description of grazing along the Bountiful Boulevard Alternative is as presented in FEIR/S, II/3.3.1.7.3. Appendix C provides details of the three USFS allotments traversed by this proposed variation.

Pages Lane Alternative

A narrative description of grazing along the Page Lane Alternative is as presented in FEIR/S, II/3.3.1.7.3. Appendix C provides details of the three USFS allotments traversed by this proposed variation.

Bountiful Peak Alternative

A narrative description of grazing along the Bountiful Peak Alternative is as presented in FEIR/S, II/3.3.1.7.3. Appendix C provides details of the three USFS allotments traversed by this proposed variation.

3.2.1.8 Socioeconomics

Details on population, housing, and economic considerations would not differ from those discussed in Section 3.1.8.1.

3.2.1.8.1 Traffic

The Wasatch Alternatives cross a number of powerlines, telephone lines, pipelines, and residential streets. Table 3.2-5 presented below includes the major categories of transportation and the number of crossings. Because of the urban development along portions of the routes, residential streets were not included in the crossings.

Because portions of these alternatives cross the Wasatch-Cache National Forest, refer to Section 3.2.1.8.4 for information on the Recreational Opportunity Spectrum (ROS) designations of Forest land crossed for each alternative. Access is limited on Forest land by restrictions of the ROS. The existing roads on the National Forest land are primarily designed, constructed, and maintained for recreational rather than industrial vehicles.

Bountiful Boulevard Alternative

This route will be constructed on the same corridor as the proposed Bountiful Boulevard (partially completed at present) in Bountiful City. Access in Ward and Holbrook Canyons may be difficult since there are no existing roads. The Semiprimitive Nonmotorized ROS designation restricts motorized use of Forest Land in the first mile of this variation.

Pages Lane Alternative

Pages Lane Alternative will be constructed on or within 4000 South Street/1800 North Street on the boundary of the Bountiful City/Centerville City ~~north--of--the--Bountiful--City~~ limits. Additional city streets crossed by Pages Lane Alternative are 400 East, Main Street (S.R. 106), 200 West, and 800 West streets, all crossed north of the Bountiful City limits.

Table 3.2-5

TRANSPORTATION CORRIDOR CROSSINGS, WASATCH VARIATION ALTERNATIVES

State/ County	U.S. Interstate	U.S. Federal	State	County & Local	Railroads 1/	Aqueducts
Bountiful Peak Variation						
UTAH						
Salt Lake	-	-	-	2	-	-
Morgan	-	-	-	-	-	-
Davis	I-15	89	106, 68	5	UP, D&RGW	-
Bountiful Boulevard Variation						
Davis	-	-	-	2	-	-
Pages Lane Variation						
Salt Lake	-	-	-	2	-	-
Davis	I-15	89	106, 68 255	3	UP, D&RGW	1

1/ UP = Union Pacific
D&RGW = Denver and Rio Grande

Bountiful Peak Alternative

Access for this alternative would be on the Forest Service roads it parallels and urban roads which give easy access. The route parallels the Skyline Drive for approximately 3 miles. This drive is heavily used by Forest visitors and valued for its spectacular vistas.

3.2.1.8.2 Noise

Ambient noise associated with the Wasatch Variation has been discussed in FEIR/S, II/3.3.1.8.2. Numerous noise sensitive receptors have been identified along both the Bountiful Boulevard and Pages Lane Alternatives. No noise sensitive receptors have been identified along the Bountiful Peak Alternative.

3.2.1.8.3 Recreational Resources

Refer to FEIR/S, II/3.1.8.4 and 3.3.1.8.3 for information concerning Forest Service recreational opportunity spectrum (ROS) categories and the dispersed recreational opportunities available on Forest Service land.

Bountiful Boulevard Alternative

This proposed alternative leaves the Wasatch Variation at WV MP 39.6. The alternative traverses Wasatch-Cache National Forest land within the ROS category of Semiprimitive Nonmotorized for one mile. The route leaves Forest Service land and continues to the gauging station where it turns south. One-half mile from this turn, the route becomes adjacent to Forest Service land categorized as Semiprimitive Motorized for one-third mile. The route then continues on private land. The route passes between portions of the Bountiful Municipal Golf Course. ~~There are no known developed recreational facilities within the analysis corridor.~~

The route would traverse Ward and Holbrook Canyons which are heavily used by the general public for hiking and hunting. Mueller Park Road which leads to Mueller Park is also crossed by this alternative.

Pages Lane Alternative

This proposed alternative also begins at WV MP 39.6. The first mile traverses Forest Service land designated as Semiprimitive Nonmotorized. The first 1.25 miles of the route follows the Bountiful Boulevard Alternative then leaves the alternative and travels north. It then enters .8 miles of a Forest Service designated Roaded Natural Appearing Area. It leaves the Forest

Service lands traveling through an urban area until joining the UP&L ROW west of I-15. The route would be adjacent to a city park on Pages Lane and adjacent to a golf course near the UP&L ROW.

Bountiful Peak Alternative

The Bountiful Peak Alternative leaves the Wasatch Variation at WV MP 38.5. The alternative begins in Forest Service land designated as Semiprimitive Nonmotorized and continues for approximately ~~1.5~~ 1.6 miles until it enters a Roaded Natural Appearing area for approximately ~~3.5~~ 4.1 miles. The route then re-enters a Semiprimitive Nonmotorized designated area for an additional ~~2.5~~ 2.7 miles. The variation traverses a helicopter skiing area in the first two miles and parallels the area for another 1.5 miles.

The proposed route follows a trail from the point of divergence from the Wasatch Variation for 2.5 miles. The alternative then parallels Skyline Drive for approximately 3 miles to Bountiful Peak. The Utah Travel Council considers this road as a "Panoramaland Motor Tour" affording spectacular panoramic views. Skyline Drive is also the southern access for the Bountiful Peak Campground which is located one mile outside of the analysis corridor.

Once the route leaves Forest Service land there are ~~no~~ few developed recreational facilities and the number of dispersed recreational opportunities are reduced. The route would be adjacent to the same golf course as discussed for Pages Lane.

3.2.1.9 Land Ownership/Use

Land ownership and land use information is provided in Tables 3.2-6 and 3.2-7.

Table 3.2-6

LAND OWNERSHIP, WASATCH VARIATION ALTERNATIVES

			Private		FS	
Alternative	County, State	Total	Miles	%	Miles	%
Bountiful Blvd.	Davis, UT	6.7	5.7	(85)	1.0	(15)
Pages Lane	Davis, UT	10.9	9.1	(84)	1.8	(16)
	Salt Lake, UT	2.8	2.8	(100)	-	-
Subtotal		13.7	11.9	[87]	1.8	[13]
Bountiful Peak	Davis, UT	16.6	8.7	(52)	7.9	(48)
	Salt Lake, UT	2.8	2.8	(100)	-	-
	Morgan, UT	.5	-	-	.5	(100)
Subtotal		19.9	11.5	[58]	8.4	[42]

Table 3.2-7

LAND USE, WASATCH VARIATION ALTERNATIVES

Alternative	County, State	Total Miles Traversed	Grazing/ Rangeland Miles	Grazing/ Rangeland %	Irrigated/ Non-Irrigated Agriculture Miles	Irrigated/ Non-Irrigated Agriculture %	Commercial/ Industrial Miles	Commercial/ Industrial %	Residential Miles	Residential %
Bountiful Blvd.	Davis, UT	6.7	2.5	(37)	-	-	-	-	4.2	(63)
Pages Lane	Davis, UT	10.9	4.2	(38)	3.9	(36)	.5	(5)	2.3	(21)
	Salt Lake, UT	2.8	-	-	2.3	(82)	.5	(18)	-	-
Subtotal		13.7	4.2	[31]	6.2	[45]	1.0	[7]	2.3	[17]
Bountiful Peak	Davis, UT	16.6	8.3	(50)	8.0	(48)	-	-	.3	(2)
	Salt Lake, UT	2.8	-	-	2.8	(100)	-	-	-	-
	Morgan, UT	.5	-	-	-	-	.5	(100)	-	-
Subtotal		19.9	8.3	[42]	10.8	[54]	.5	[3]	.3	[1]

The first portion of the Bountiful Boulevard/Pages Lane alternative follows the MFR pipeline ROW from about WV MP 39.6 along the Ward Canyon Utility Corridor within the Wasatch-Cache National Forest to a junction with the local street system. The management plan for the Wasatch-Cache National Forest allows for location of additional pipelines within existing utility corridors.

Contacts were made in writing in April, 1988, with the jurisdictions in the project vicinity regarding adopted plans, regulations, and concerns which might be affected by the proposed pipeline corridor or its variations. Verbal comments were received during scoping and related meetings in the spring of 1988 and again in August, 1988. Responses to written information requests by cities in the Salt Lake area~~, with the exception of the City of North Salt Lake~~ were received from the City of North Salt Lake, Davis County Planning Commission, Salt Lake County Public Works, and the City of Farmington. Concerns expressed ~~by the City of North Salt Lake~~ relate to minor potential land use conflicts with ~~a short~~ segments of the Wasatch Variation analyzed in the FEIR/S.

3.2.1.9.1 Bountiful Boulevard Alternative

This segment ~~departs~~ enters the MFR ROW at WV MP 39.6 and traverses privately owned lands until ~~entering~~ approximately 0.3 mile east of the Bountiful Boulevard ROW where it descends to the street. This parcel is currently open land, but shows evidence of previous use for sand/gravel processing. Over 100 homes, a fire station, and a planned school currently exist and significant amounts of grading for residential development is occurring in the vicinity of Bountiful Boulevard near the point where this alternative joins the road ROW. Homes are being built along Bountiful Boulevard, and the area appears to be designated for low density, single family residential use. Approximately seven utility lines are present beneath sections of Bountiful Boulevard. At the south end of Bountiful Boulevard where this alternative connects with the FEIR/S analyzed Wasatch Variation, there is currently a sand and gravel extraction operation.

3.2.1.9.2 Pages Lane Alternative

This alternative follows the MFR ROW to its junction with Pages Lane. Pages Lane forms the boundary between the cities of Bountiful and Centerville. Land uses along Pages Lane range from open space (along the eastern end) to commercial and residential. Pages Lane is fronted by commercial centers for several blocks, and has ~~numerous~~ over 100 homes fronting the street. There is a small industrial area near the intersection with I-15. At the west end of Pages Lane, the route connects with the existing UP&L transmission corridor, which crosses a flat area near the Farmington Bay Waterfowl Management Area. There are currently eight utilities beneath Pages Lane.

~~(The MFR pipeline runs under Porter Lane, about a half mile to the north of Pages Lane. This street, within Centerville, has less commercial frontage and fewer homes than currently exist along Pages Lane.)~~ (Over 120 homes, five commercial buildings, and one small industry face out onto Porter Lane. Underground utilities which are routed in or adjacent to the roadway include the 30-inch O.D. MFR natural gas line and six utility lines.)

3.2.1.9.3 Bountiful Peak Alternative

This alternative departs the Ward Canyon Utility Corridor within the National Forest at WV MP 38 of the Wasatch Variation and heads in a north-northwesterly direction toward Bountiful Peak. The route then travels for some distance along Skyline Drive Road. This route traverses 8.4 miles of land in the Wasatch-Cache National Forest which is not included in an existing utility corridor. According to the Forest Plan, portions of this area have important scenic qualities.

Once out of the National Forest, this route traverses a primarily agricultural area before joining the utility corridor for UP&L's transmission line. Commercial and industrial establishments and a gravel pit exist between the Forest Service land and the UP&L ROW. The route would also be adjacent to a golf course. This utility corridor crosses open marshy areas and mudflats to a point north of the Salt Lake City airport. The utility corridor passes near the Farmington Bay Waterfowl Management Area.

3.2.1.10 Cultural Resources

3.2.1.10.1 Archaeology

Bountiful Boulevard Alternative

One survey is reported extending adjacent to the proposed construction corridor for a length of 0.25 miles or about 1% of the 25.8 mile segment length. No sites are reported within the mile-wide analysis corridor along the length of the alternative.

Pages Lane Alternative

Two surveys are reported. These together cover 0.42 miles (1.7%) of the proposed construction corridor which extends for a length of 25 miles. One site, a burial of unknown age and significance is reported from the analysis corridor but is located outside the indirect impact zone.

Bountiful Peak Alternative

No surveys are reported from this alternative which extends for a length of 35.3 miles due to its northerly re-route. The burial site reported for the Pages Lane Alternative also lies within the analysis corridor but outside the indirect impact corridor of Bountiful Peak Alternative.

Compressor, Metering and Microwave Stations

Only two microwave stations, both at existing station locations, are proposed for the Wasatch Variation.

3.2.1.10.2 American Indian Concerns

These alternatives fall within the traditional ethnographic use areas of the Ute Indian Tribe of Utah. Their particular concerns have been discussed in the FEIR/S, II/3.1.10.2.

3.2.1.11 Paleontological Resources

Refer to Table 3.2-8 for a summary of significant formations crossed by the variation alternatives.

Table 3.2-8

PALEONTOLOGICAL FORMATIONS, WASATCH VARIATION ALTERNATIVES

Age	Formation	Potential 1/ Vertebrate/ Invertebrate	Sensitivity
	Bountiful Boulevard Alternative		
Cretaceous	Kelvin Formation	H/L	Yes
Paleocene-Eocene	Knight Conglomerate	H/H	Yes
Cretaceous-Paleocene	Wanship Formation	M/M	No
Quaternary	Quaternary alluvium	H/L	Yes
Cretaceous	Frontier Formation	H/H	Yes
Paleocene	Almy Formation	L/H	No
Eocene	Fowkes Formation	H/H	Yes
Jurassic	Preuss Sandstone	L/H	No
Cretaceous	Echo Canyon Conglomerate	L/H	No
Eocene	Norwood Tuff	H/L	Yes
Paleocene-Eocene	Wasatch Formation	H/L	Yes
Precambrian	Precambrian Metamorphic	L/L	No
Tertiary	Tertiary Sedimentary Rocks	L/L	No
Pleistocene	Lake Bonneville Group	H/H	Yes

Table 3.2-8 (continued)

PALEONTOLOGICAL FORMATIONS, WASATCH VARIATION ALTERNATIVES

Age	Formation	Potential 1/ Vertebrate/ Invertebrate	Sensitivity
	Bountiful Boulevard Alternative (continued)		
Pliocene (?)	Salt Lake Group	H/H	Yes
Mississippian	Great Blue Formation	L/H	No
Pennsylvanian-Permian	Oquirrh Formation	L/H	No
Mississippian	Mississippian Marine Sediments	L/H	No
Devonian/ Mississippian	Pinyon Peak	L/H	No
Cambrian	Ophir Formation	L/H	No
Ordovician-Devonian	Ordovician-Devonian Marine Sediment	H/H	Yes
	Pages Lane Alternative		
Cretaceous	Kelvin Formation	H/L	Yes
Paleocene-Eocene	Knight Conglomerate	H/H	Yes
Cretaceous-Paleocene	Wanship Formation	M/M	No
Quaternary	Quaternary alluvium	H/L	Yes
Cretaceous	Frontier Formation	H/H	Yes
Paleocene	Almy Formation	L/H	No
Eocene	Fowkes Formation	H/H	Yes
Jurassic	Preuss Sandstone	L/H	No
Cretaceous	Echo Canyon Conglomerate	L/H	No
Eocene	Norwood Tuff	H/L	Yes
Paleocene-Eocene	Wasatch Formation	H/L	Yes
Precambrian	Precambrian Metamorphic	L/L	No
Tertiary	Tertiary Sedimentary Rocks	L/L	No
Pleistocene	Lake Bonneville Group	H/H	Yes
Pliocene (?)	Salt Lake Group	H/H	Yes
Mississippian	Great Blue Formation	L/H	No
Pennsylvanian-Permian	Oquirrh Formation	L/H	No
Mississippian	Mississippian Marine Sediments	L/H	No
Devonian/ Mississippian	Pinyon Peak	L/H	No
Cambrian	Ophir Formation	L/H	No
Ordovician-Devonian	Ordovician-Devonian Marine Sediment	H/H	Yes
Quaternary	Recent Marshes	L/L	No
Quaternary	Recent Landslides	L/L	No
Quaternary	Glacial Deposits	L/L	No

Table 3.2-8 (continued)

PALEONTOLOGICAL FORMATIONS, WASATCH VARIATION ALTERNATIVES

Age	Formation	Potential [1] Vertebrate/ Invertebrate	Sensitivity
	Bountiful Peak Alternative		
Cretaceous	Kelvin Formation	H/L	Yes
Paleocene-Eocene	Knight Conglomerate	H/H	Yes
Cretaceous-Paleocene	Wanship Formation	M/M	No
Quaternary	Quaternary alluvium	H/L	Yes
Cretaceous	Frontier Formation	H/H	Yes
Paleocene	Almy Formation	L/H	No
Eocene	Fowkes Formation	H/H	Yes
Jurassic	Preuss Sandstone	L/H	No
Cretaceous	Echo Canyon Conglomerate	L/H	No
Eocene	Norwood Tuff	H/L	Yes
Paleocene-Eocene	Wasatch Formation	H/L	Yes
Precambrian	Precambrian Metamorphic	L/L	No
Tertiary	Tertiary Sedimentary Rocks	L/L	No
Pleistocene	Lake Bonneville Group	H/H	Yes
Pliocene (?)	Salt Lake Group	H/H	Yes
Mississippian	Great Blue Formation	L/H	No
Pennsylvanian-Permian	Oquirrh Formation	L/H	No
Mississippian	Mississippian Marine Sediments	L/H	No
Devonian/ Mississippian	Pinyon Peak	L/H	No
Cambrian	Ophir Formation	L/H	No
Ordovician-Devonian	Ordovician-Devonian Marine Sediment	H/H	Yes
Quaternary	Recent Marshes	L/L	No

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[1] L = Low, M = Moderate, H = High

3.2.1.12 Visual Resources

Visual concerns expressed by Bountiful residents and others relate mainly to persistance of pipeline scars. The alternatives each include portions traversing the Wasatch-Cache National Forest and portions through urbanized areas, before joining the high voltage utility line corridor which runs just to the west of these communities.

Within the Wasatch-Cache National Forest, the scenic environment is characterized by mountainous terrain with steep slopes, peaks and ridgelines. Along the western edge of the National Forest, terrain slopes to the flat lands which surround the Great Salt Lake. In this transition area, evidence of slope failures and mudslides can be seen. While vegetation is sparse at the higher elevations, the lower elevations have lush vegetation, including both coniferous and deciduous trees. Predominant colors in the lower elevations of the forest are greens, while textures are medium to coarse.

3.2.1.12.1 Bountiful Boulevard Alternative

BB 39.6-40.7, VRM/VQO: FS Class PR
Description: Wasatch-Cache National Forest. This portion of the route follows the utility corridor for the MFR pipeline. A portion of the corridor as it currently appears in this area is shown in Figure 3.2-1. The landforms in the area range from higher elevation peaks and ridgelines, to lower elevation transitional slopes. The existing MFR pipeline corridor follows a ridgeline from elevations in excess of 7,000 feet dropping to about 6,000 feet. Some revegetation has occurred along this corridor, but vegetation is less dense and lower to the ground than adjacent to the previously disturbed area. Textures along the corridor range from fine to medium. Part of this area is accessible to recreational vehicles and hikers.

BB 40.7-46.4, VRM/VQO: Not Applicable
Description: Davis County/City of Bountiful. Landforms along the approximately one mile long segment of the route before it joins the Bountiful Boulevard ROW are lower elevation transitional slopes, dropping from an elevation of about 6,000 feet to 5,200 feet. This area shows some effects of past slope failure, with vegetation being predominantly shrubs, brush, grasses, and other ground cover. Greens predominate in undisturbed areas, with textures ranging to medium. As this area is along the fringe of the urban area, modifications include previous sand/gravel extraction, development of paved and unpaved roads, and scattered homes.

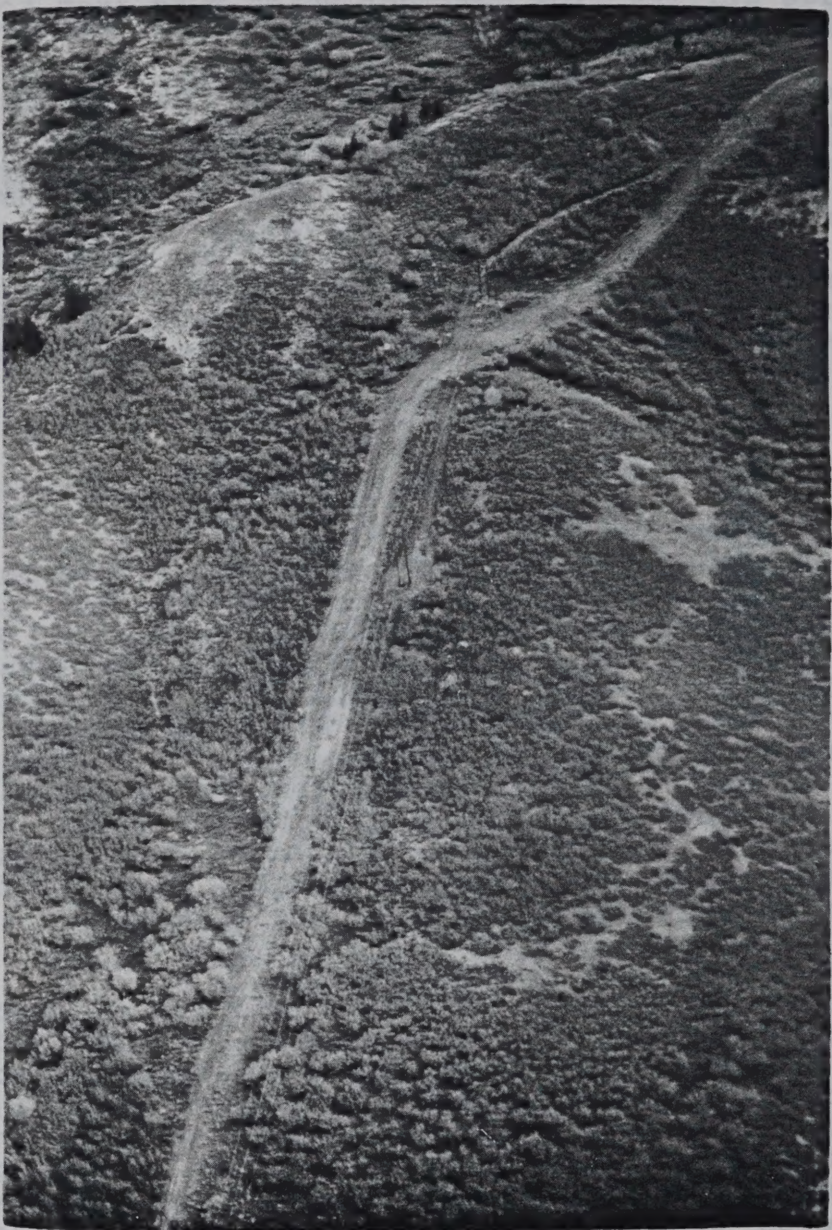

Figure 3.2-1

AIRVIEW OF EXISTING WARD CANYON UTILITY CORRIDOR

3.2.1.12.2 Pages Lane Alternative

PL 39.6-40.7, VRM/VQO: FS Class PR
Description: Wasatch National Forest. This portion of the route follows the utility corridor for the MFR pipeline. (See Figure 3.2-1.) The landforms in the area range from higher elevation peaks and ridgelines, to lower elevation transitional slopes. The existing MFR pipeline corridor follows a ridgeline from elevations in excess of 7,000 feet to about 6,000 feet. Some revegetation has occurred along this corridor, but vegetation is less dense and lower to the ground than adjacent undisturbed area. Textures along the corridor range from fine to medium. Part of this area is accessible to recreational vehicles and hikers.

PL 42.9-43.6, VRM/VQO: FS Class PR
Description: Davis County/Wasatch National Forest. Landforms along this area are characterized by lower elevation transitional slopes. Colors which predominate are greens and browns, with textures ranging to medium. The primary modification in this area is the MFR pipeline corridor, which has not yet revegetated in most areas due to continued disruption by off-road vehicle use. The pipeline corridor dips along the ridgeline from an elevation of about 6,000 feet, and travels along the 5,400 contour for about a mile, before dipping again and coming out of the forest and into the edge of the urbanized area. Evidence of slope failure is visible along this area.

PL 43.6-46.0, VRM/VQO: Not Applicable
Description: Pages Lane. Modifications adjacent to the road right-of-way include orchards along the eastern edge of the urbanized area, commercial development, and moderate to dense single family residential development. After crossing Interstate 15 and approaching the UP&L transmission line, residential development becomes less dense as the elevation drops below 4,200 feet and the edge of the marshy area adjacent to the Farmington Bird Refuge becomes visible.

PL 46.0-53.3, VRM/VQO: Not Applicable
Description: Davis County/Salt Lake County. In this area, the corridor follows the existing UP&L high voltage transmission line corridor through the marshy areas and mud flats to the west of the Great Salt Lake. Predominant colors in this area are browns and greens. This area is visible from the residential areas to the east, and in the distance for those up the sides of the transitional slopes of the mountains some three miles away.

3.2.1.12.3 Bountiful Peak Alternative

BP 38-47.6, VRM/VQO: FS Class PR
Description: Wasatch-Cache National Forest. Landforms in this area are characterized by steep mountain peaks and ridgelines. Elevations range from about 8,000 feet to over 9,200 at Bountiful

Peak, and back down to below 6,000 feet at the point where lower elevation transitional slopes begin. The corridor dips through the transitional slopes and into the flat area adjacent to the marshy areas to the west of I-15. Modifications are limited to those associated with the low density urban area and orchards which occur on the lower transitional slopes and the flats between the edge of the National Forest and the Interstate highway. Vegetation at higher elevations is sparse, and colors range from greens to dark grays. As elevations drop, vegetation increases, primarily coniferous forest with scattered groupings of aspen and other deciduous trees. In areas below 7,000 feet, colors include large amounts of green, with some grays and browns; while textures range from medium to coarse.

BP 47.6-58.4, VRM/VQO: Not Applicable
Description: Davis County/Salt Lake County. In this area, the corridor follows the existing UP&L high voltage transmission line corridor through the marshy areas and mud flats to the west of the Great Salt Lake. Predominant colors in this area are browns and greens. This area is visible from the residential areas to the east, and from the transitional slopes of the mountains some three miles away.

3.2.2 North Las Vegas Variation

The WyCal segment of the North Las Vegas Variation was necessary to rejoin the WyCal mainline rather than trending southwest as did the Kern River route. The first 109.5 miles of the North Las Vegas Variation have been addressed in FEIR/S, II/3.3.4. The discussion which follows was necessary to reconnect with the WyCal mainline at the Nevada/California border. Since the proposed WyCal segment of the North Las Vegas Variation closely follows the border between Nevada and California, and since the California portion adjacent to the variation is within the East Mojave Scenic Area, the analysis corridor for the route extends from the border northeast one mile rather than one-half mile on each side of the route (see Vol. IV, WyCal Maps 19-21).

3.2.2.1 Air Quality

See Section 3.1.1 for baseline information applicable this variation.

3.2.2.2 Geology

See FEIR/S, II/3.3.4.2 for information on the North Las Vegas Variation of Kern River from NLV 0 to 109.5.

From NLV 109.5 to 151, the North Las Vegas Variation is located in the Basin and Range Physiographic Province near the stateline between Nevada and California. The proposed route parallels the

State Line Fault for approximately six miles along this segment [Jennings, 1975]. ~~This area does not have any known active faults of Quaternary age or younger [Nakata et al., 1982].~~ The proposed variation is outside the current area of subsidence which has developed within the Las Vegas Valley [Bell, 1981].

No active volcanos lie near the route [Stewart and Carlson, 1978]. The route does cross alluvial fans and other low areas subject to flash flooding.

Table 3.2-9 summarizes the geologic and physiographic characteristics of the last 41.5 miles of the variation.

Table 3.2-9

GEOLOGIC AND PHYSIOGRAPHIC CONDITIONS,
NORTH LAS VEGAS VARIATION (MP 109-151)

Basin and Range Prov.	Goodsprings Valley to Ivanpah Valley (NLV 109-121.1)	Lucy Gray, McCullough, and New York Mtns (NLV 118-133)	Piute Valley (NLV 133-151)
Geologic Unit	Alluvium	Metamorphic rock	Alluvium
Age	Quaternary	Precambrian	Quaternary
Topography	Low relief, gentle to flat slopes	Low relief, gentle slopes	Low relief, gentle to flat slopes
Comments	Unconsolidated to poorly consolidated alluvial deposits	Metamorphics - gneiss, schists to gneissic granites	Unconsolidated to poorly consolidated sediments

3.2.2.3 Soil

The distribution of soil mapping units along this route variation and the characteristics of individual soils are presented in Appendix A.

3.2.2.4 Surface Water

See FEIR/S, II/3.3.4.4 for a description of water resources along the Kern River North Las Vegas Variation. One intermittent stream, Big Tiger Wash, would be crossed by the extension of the North Las Vegas Variation at MP 126.4.

3.2.2.5 Groundwater

Groundwater conditions along the route of the proposed North Las Vegas Variation are similar to those described for the Basin and Range valleys and mountains in FEIR/S, I/3.1.5, II/3.1.5, and II/3.3.4.

3.2.2.6 Freshwater Biology

General Freshwater Biology. See FEIR/S, II/3.3.4.6 for a description of fishery resources along the North Las Vegas Variation.

Aquatic Species of Special Concern. See FEIR/S, II/3.1.6.4 for a description of species of special concern along this variation.

3.2.2.7 Terrestrial Biology

3.2.2.7.1 Vegetation

General Vegetation. The portion of the North Las Vegas Variation (NLV 109.5-151) not described in the Kern River document would traverse Desert Saltbush Scrub and Mojavean Creosote Bush Scrub as described in the FEIR/S, II/Appendix B. The route would cross Crescent Springs, ~~appears to be the only~~ a wetland/riparian area, ~~along the route although the route would cross several~~ as well as intermittent washes which could support riparian vegetation. Table 3.2-10 lists the vegetation types and milepost location for this part of the North Las Vegas route.

Table 3.2-10

VEGETATION COMMUNITY TYPES, NORTH LAS VEGAS VARIATION

Geographic Region	Community Type	Milepost
Mojave Desert	Mojavean Creosote Bush Scrub	109.5-110
	Desert Saltbush Scrub	110-111
	Mojavean Creosote Bush Scrub	111-151
	Wetland/Riparian	126-127

Plant Species of Special Concern. The five plant species of concern listed in the Kern River description may occur on the area traversed by the portion of the WyCal route not previously described. Appendix B of this Supplement describes these species and their habitat, including Merriam's poppy (C3), which may also occur along the proposed route.

3.2.2.7.2 Wildlife

General Wildlife. A description of general wildlife is presented in FEIR/S, II/3.3.4.7.2. This description is also applicable to the Blue Diamond Compressor Station located at NLV 78.5.

Wildlife Species of Special Concern. Sensitive wildlife species are described in FEIR/S, II/3.3.4.7.2, and include the Blue Diamond Compressor Station at NLV 78.5. Additional sensitive species ~~concerns~~ habitats exist along the latter segment of this proposed variation (NLV 109.5-151) and are discussed below.

One additional crucial desert tortoise habitat site (>40 tortoise/mi^2) at Piute Valley is crossed by this proposed variation for a total of 4.5 miles. The Gila monster, a Federal candidate species and Nevada state rare species, is an uncommon inhabitant of the sandy washes in southern Nevada. No specific sites within the analysis corridor have been delineated as sensitive habitat. ~~Four crucial desert tortoise habitat sites (>40 tortoise/mi^2) are crossed by this proposed variation for a total of 40 miles. These habitat sites are Arrow Canyon, Red Rock, Goodsprings, and Piute Valley.~~

The proposed variation would traverse or be adjacent to 23 miles of Desert bighorn sheep habitat. The proposed route would traverse a total of 4.5 miles of bighorn crucial summer habitat: three miles in the northern New York Mountains, and 1.5 miles in the Castle Mountains.

3.2.2.7.3 Grazing

The North Las Vegas Variation would intersect ~~10~~ 3 additional BLM livestock allotments that vary in size from ~~14,243~~ 62,243 to ~~310,364~~ 137,217 acres. These allotments are primarily ephemeral cattle range. Appendix C provides detailed information for allotments traversed by this proposed route.

3.2.2.8 Socioeconomics

Details on population, housing, and economic characteristics would be similar to those discussed in Section 3.1.8.1.3.

3.2.2.8.1 Traffic

The extension of the North Las Vegas Variation begins at NLV MP 109.5 and closely follows the California-Nevada border for 41.5 miles. The proposed route crosses a number of transmission lines, pipelines, four-wheel drive trails, jeep trails, unimproved roads, a railroad, a U.S. Interstate, and a State road. See Table 3.2-11 for specific transportation corridor crossing counts.

Table 3.2-11

TRANSPORTATION CORRIDOR CROSSINGS,
NORTH LAS VEGAS VARIATION

State/ County	U.S. Interstate	State Road	County & Local	Railroad
NEVADA				
Clark	I-15	S.R. 164	1	Union & Pacific

At NLV MP 109.5 the route crosses U.S I-15, a four-lane highway which runs north to Las Vegas, Nevada and south to Barstow, California. The route crosses the ~~UP~~ Union Pacific railroad at approximately NLV MP 112. For approximately 17 miles, the proposed alternative would be adjacent or overlapping existing four-wheel drive trails, unimproved roads or pipeline corridors.

3.2.2.8.2 Noise

This portion of the North Las Vegas Variation would connect with the WyCal Mainline near the Nevada-California border. This portion of the North Las Vegas variation would run through essentially undeveloped rural areas which have ambient noise levels in the 35 to 40 dBA range.

Since the proposed WyCal compressor station location is new, the noise impact of the station was modeled using the AGASOUND noise modeling program. Calculated noise levels due to the station were 58 dBA at 200 meters, 51 dBA at 400 meters, 41 dBA at 1,000 meters and 33 dBA at 2,000 meters. No noise sensitive receptors currently lie within a 2,000 meter radius of the site.

3.2.2.8.3 Recreational Resources

No recreational facilities exist along the North Las Vegas Variation. Dispersed recreational opportunities include hunting, hiking, picnicking, rockhounding, and off-road vehicle use. Off-road vehicle races attract the interest of the international ORV racing community and are very popular in Nevada. The southern Nevada area is used as filming locations for major feature films and commercials which generates significant revenue to the state.

In the past, two large annual ORV events have been regularly held within the portion of the Stateline Resource area crossed by the pipeline route. These two events, the Mint 400 and the Frontier 500, normally attract over 100,000 spectators and competitors to the area. The proposed variation crosses a number of jeep and four-wheel drive trails having the potential for less organized ORV use.

3.2.2.9 Land Ownership/Use

The WyCal North Las Vegas Variation follows the route analyzed in FEIR/S, II/3.3.4.9 up to NLV MP 109.5. At this point the route diverges and heads in a southeasterly direction to connect with the point where the previously analyzed East Las Vegas System Alternative crosses the California/Nevada border. All but one mile of the 41.5 miles associated with this new segment are under the jurisdiction of the Bureau of Land Management as part of Stateline-Esmeralda Resource Area (see Table 3.2-12).

Land uses within the areas under the jurisdiction of the Bureau of Land Management are grazing/rangeland, mining, and open space for recreation and wildlife uses (Table 3.2-21). The land ownership in the immediate vicinity of the junction of the proposed corridor with Interstate 15 (MP 110-111) is private. Land use in this area is commercial.

Table 3.2-12

LAND OWNERSHIP, NORTH LAS VEGAS VARIATION

County, State	Total	Private Miles	Private %	BLM Miles	BLM %	Bureau of Reclamation Miles	Bureau of Reclamation %
Clark, NV	41.5	1.0	(2)	37.0	(89)	3.5	(9)

Table 3.2-13

LAND USE, NORTH LAS VEGAS VARIATION

County, State	Total	Grazing/ Rangeland Miles	Grazing/ Rangeland %	Commercial Miles	Commercial %
Clark, NV	41.5	40.5	(98)	1.0	(2)

3.2.2.10 Cultural Resources

3.2.2.10.1 Archaeology

There are eight sites recorded in the analysis corridor associated with this segment of the variation: two rockshelters, a roadbed, a mill, a lithic and ceramic scatter, a historic railroad bed, a historic trash scatter, and a lithic scatter. No sites are listed on, or have been determined to be eligible for, the national or State Registers.

Sixteen surveys are reported for this segment of the variation for a total coverage of .5 mile (2%).

No surveys have been carried out in the vicinity of the Blue Diamond Compressor Station; however, a portion of the Old Spanish Trail lies in the study corridor.

3.2.2.10.2 American Indian Concerns

American Indian concerns relating to the Kern River North Las Vegas route corridor adopted by WyCal have been discussed in FEIR/S, II/3.3.4.10.2. The new WyCal segments of the North Las Vegas Variation corridor do not pass through American Indian reservations or other American Indian lands. The WyCal segment does, however, pass near Ivanpah and Roach Lakes, cross the northern portion of the Ivanpah Valley, and terminate in Piute Valley just short of the Piute Wash after passing near the McCullough Mountains.

The Piute Wash area is considered sensitive by the Fort Mojave Indians. The Ivanpah Valley and its lakes, as well as the McCullough Mountains, are also areas of concern for the Las Vegas and Pahrump tribal groups [Stoffle and Dobyns, 1982; 167-168]. Resources and location types of particular concern to these groups are discussed in FEIR/S, I/3.1.10.2 and II/3.1.10.2. See also Stoffle, et al. [1983; 92] for a detailed discussion of Native American concerns in this area.

3.2.2.11 Paleontological Resources

Table 3.2-14 provides information on the paleontologically important formations traversed by the North Las Vegas Variation.

Table 3.2-14

PALEONTOLOGICAL FORMATIONS, NORTH LAS VEGAS VARIATION

Age	Formation	Potential [1] Vertebrate/ Invertebrate	Sensitivity
NEVADA			
Triassic	Moenkopi/Chinle Formations	H/H	Yes
Quaternary	Quaternary alluvium	H/L	Yes
Pliocene	Muddy Creek Formation	L/H	No
Pennsylvanian-Permian	Kaibab/Toroweap Formations	M/M	No
Precambrian	Undifferentiated	L/L	No
Miocene	Volcanics	L/L	No

[1] L = Low, M = Moderate, H = High

3.2.2.12 Visual Resources

An approximate 41 mile segment of pipeline has been ~~substituted~~ added to the end ~~for a portion~~ of the previously analyzed North Las Vegas Variation. The reader is referred to FEIR/S, II/3.3.4.12 for a discussion of the portion of the North Las Vegas Variation not addressed below.

NLV 109.5-151, VRM/VQO: BLM Class IV
Description: Stateline Resource Management Area. This area is characterized by a combination of low rolling mountains and broad desert valleys. Vegetation in the area includes species common to the Mojave desert, including creosote bush, mesquite, and sagebrush scrub. Colors range from light browns and tans to soft grays, with sparse, seasonal dottings of green and other colors from vegetation. Modifications in this area include jeep trails, mines, unimproved and improved roads, and powerlines.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 presents a discussion of the environmental consequences that would result from implementing the WyCal Pipeline Proposal and the respective variations. **THE TEXT OF THIS CHAPTER ONLY INCLUDES NEW DATA WHICH ARE UNIQUE TO THE WYCAL PROPOSAL. ALL OF THE TABLES LIST THE IMPACTS ASSOCIATED WITH THE COMPLETE WYCAL ROUTE.** The El Paso Base Case however has not been included in the tables in this section since it represents a supply proposal similar to the scenario presented for the Mojave proposal. These impacts were discussed in the FEIR/S for the Kern River, East Las Vegas, Mojave and El Paso routes. The reader is directed to the FEIR/S, I/4.2, I/4.7.1, II/4.2,4.5 to examine those impacts. When the various proposals and alternatives are compared in Volume III, the impacts associated with the El Paso Base Case are of course included in the comparisons.

In keeping with NEPA and CEQA guidelines, this chapter focuses on the impacts that are considered significant. The general approach followed throughout this chapter is to briefly discuss the range of impacts that would occur and then provide a detailed discussion of those impacts that are considered significant.

This supplement does not contain a section of planned mitigation measures. WyCal has stated in its application and in direct testimony that it would agree to all applicable mitigation measures as they were discussed in FEIR/S Volume III, except Nos. 144 and 152 recommending the use of the Wasatch and North Las Vegas Variations. These measures are incorporated by reference. These mitigation measures were utilized to make determinations on unavoidable adverse impacts.

4.2 WYCAL PIPELINE PROPOSAL

4.2.1 Air Quality

4.2.1.1 Installation/Construction Emissions and Impacts

The installation/construction phase of the proposed project includes installation of the pipeline and construction of meter and compressor stations. Emissions associated with these activities would include fugitive dust and construction equipment exhaust emissions. Exhaust emissions would include carbon monoxide (CO), sulfur oxides (SO_2), nitrogen oxides (NO_x), pollutants based on the applicant's project equipment usage.

Total estimated construction emissions for each portion of the construction activity are presented in Table 4.2-1.

Table 4.2-1

TOTAL ESTIMATED CONSTRUCTION EMISSIONS, WYCAL PIPELINE PROPOSAL, 1/

	Total Project Emissions (tons)					
	THC	NO_x	SO_2	CO	TSP	PM10
Pipeline (tons/mile)	0.13	0.71	0.07	0.38	1.99	1.29
Compressor Station (tons/station)	0.47	5.73	0.51	1.75	43.93	28.26
Sales Meter Station	0.06	0.30	0.03	1.03	0.64	0.42

1/ TSP and PM10 fugitive dust emissions include a 50 percent reduction due to watering.

Pipeline construction emissions estimates are based on the 36" pipeline from Piute Junction to Kern County. Per mile emission rates for smaller portions of the pipeline which range in size from 20 to 30" will be slightly lower.

As stated in Section 3.1, pollution emissions that occur during construction are generally exempt for PSD review because the PSD requirements specifically exempt temporary increases of SO and TSP emissions.

The EPA-approved short-term ISC model was used for this analysis. Results of the construction activity air quality impact analysis are presented in Table 4.2-2. The other states do not require modeling for construction and therefore, modeling was not done. The predictions, for comparison purposes, are measured against the National Primary Ambient Air Quality Standards (NAAQS) and the California State AAQS.

~~The results indicated that pipeline construction could exacerbate the existing 8-hour CO standard violation in Kern County. The project contribution would be fairly small in comparison to the existing background. The California 1-hour NO and the 24-hour SO standard of 131 ug/m^3 could also be exceeded. The federal primary standard (260 ug/m^3) and secondary standard (150 ug/m^3) for 24-hour TSP, as well as the California standard (50 ug/m^3) and federal standard (150 ug/m^3) for 24-hour PM10, (which already are exceeded by high background values) could also be further exacerbated by project construction.~~ The results indicated that pipeline construction could exacerbate existing violations of ambient air quality standards for particulates. Gaseous pollutant standards are not predicted to be exceeded even when maximum short-term project-related emissions are combined with worst-case urban Bakersfield background concentrations. On a very localized scale, construction activity particulate emissions will make measurably worse existing total (TSP) and respirable (PM-10) particulate levels. Any short-term air quality impacts associated with the construction of WyCal's pipeline in Kern County will be more than offset by the long-term improvements to air quality in Kern County as a result of the use of natural gas in thermally enhanced oil recovery operations.

4.2.1.2 Operational Phase Emissions and Impacts

Operational phase emissions will occur primarily due to natural gas combustion in the Solar Centaur Type "H" turbine compressors along the pipeline route. Emissions have been calculated based on manufacturer's data for comparable 3,500 BHP compressors. Annualized emission estimates derived from hourly rates have been made utilizing a worst-case "potential to emit" assumption of a 100 percent annual load factor. Any reduced load factor during compressor outage for repair, maintenance, or less than full load will reduce project emissions at each station to less than the worst-case assumption. Table 4.2-3 summarizes maximum annual emissions at each of the four pipeline compressor stations. NO_x is the primary pollutant emitted from high temperature natural gas combustion. NO_x emission rates from the use of turbine compressors are much lower than from reciprocating engines such that selection of turbines for all four compressor stations along the pipeline route maintains consistently lower NO_x levels than other proposed pipeline routes/alternatives using reciprocating engines.

Table 4.2-2

CONSTRUCTION OF WYCAL PIPELINE THROUGH KERN COUNTY, CALIFORNIA
(all values are in ug/m3)

			State and Federal Standards		Ambient Air Quality Impacts		
Pollutant	Avg. Time	California Standard	Primary	Secondary	Project Increment	Background	Total
Carbon Monoxide (CO)	1-hr	23,000	40,000	40,000	961	16,000	16,961
	8-hr	10,000	10,000	10,000	625	13,000	13,625
Nitrogen Dioxide (NO_2)	1-hr	470	--	--	422	376	798
Sulfur Dioxide (SO_2)	1-hr	655	--	--	152	393	545
	3-hr	--	--	1,300	110	175	285
	24-hr	131	365	--	39	110	149
Total Suspended Particulates (TSP)	24-hr	--	150	150	746	328	1074
Fine Suspended Particulates (PM-10)	24-hr	50	--	--	485	180	665

Background values were taken from:
CO - Bakersfield (CA)
NO_2 - Barstow (CA)
SO_2 - Riveria (AZ)
TSP - Bakersfield (CA)
PM10 - 55% of TSP
1-hr SO_2 - Bakersfield (CA)

Table 4.2-3

ANNUAL AIR POLLUTION EMISSIONS,
WYCAL PIPELINE COMPRESSOR STATIONS

Maximum Project Emissions (tons/year)

Compressor Station	NO_x	CO	NMHC	SO_2	Part.
Anschutz	94.9	8.6	0.13	negl.	negl.
Blackrock	91.7	9.1	0.14	negl.	negl.
Henderson	185.0	16.7	0.22	negl.	negl.
Topock	194.5	17.1	0.22	negl.	negl.

NO_x emission rates exceed 100 tons per year at the larger compressor stations at Henderson and Topock. Pipeline compressors are not a designated source, however, for purposes of PSD review. The threshold emission level triggering PSD review for non-designated sources is 250 tons per year. None of the pipeline compressor stations are therefore major sources in any existing attainment areas.

The only non-attainment area where non-negligible air pollution emissions from compressor stations will be subject to heightened regulatory agency review is in Clark County, Nevada. Clark County currently does not have a threshold limit for NO_x that will trigger a New Source Review, but it does have provisions for review if a new source locates within one mile of any existing populated receptor site or at the sole discretion of the county air pollution control officer [D. Lee, Clark County APCD, 1987, personal communication]. Given the existing violations of air quality standards and degraded visibility in the Las Vegas Valley, public and agency review will be required to obtain an "authority to construct" permit from the APCD for the Henderson compressor station.

The ambient impacts from the four compressor stations are summarized in Table 4.2-4. No state or federal AAQS are predicted to be violated, nor are any existing violations predicted to be made measurably worse from compressor station exhaust emissions.

A Level-1 Visibility Impact Analysis recommended by the EPA was previously performed to assess the operation impacts of proposed compressor stations. The results of the Level-1 Visibility Impact Screening Analysis indicated that none of the proposed compressor stations would cause any significant visibility impacts at the PSD Class I areas. The fact that NO_x emissions for the WyCal pipeline, as the primary potential visibility degrading pollutant from the project, are much lower than Mojave/Kern emissions suggests that visibility impacts for the WyCal project will be insignificant.

4.2.2 Geology

The environmental consequences associated with geology on the WyCal Mainline route are the same as those described for the specific geologic hazards outlined in the FEIR/S, I,II/4.2.2 and I/4.7.1.2. No new or varying geologic hazards were identified. See Table 4.2-5 for the significant geologic hazards.

4.2.3 Soil

See FEIR/S, I/4.2.3, I/4.7.1.3, and II/4.2.3 for information on soil impacts. The distribution of potential soil impacts is presented in Table 4.2-6.

Table 4.2-4

AIR QUALITY IMPACT ANALYSIS, ANSCHUTZ COMPRESSION STATION

Pollutant/ Exposure	Wyoming Standard	Federal Primary Standard	Federal Secondary Standard	Project Increment	Ambient Air Quality Impacts	
					Background	Total
Nitrogen Dioxide (NO_x)						
Annual	100	100	100	3	38	41
Sulfur Dioxide (SO_2)						
Annual	52	78	-	0	26	26
24-hour	260	365	-	0	183	183
TSP						
3 hour	-	-	1,300	0	419	419
Carbon Monoxide						
8 hour	10,000	10,000	10,000	2	9,000	9,002
1 hour	40,000	40,000	40,000	3	17,000	17,003
Total Suspended Part (TSP)						
Annual	60	75	60	0	52	52
24-hour	150	260	150	0	353	353
Inhalable Part. (PM-10)						
24-hour	150	150	-	0	177 1/	177

Table 4.2-4 (continued)

AIR QUALITY IMPACT ANALYSIS, BLACKROCK COMPRESSION STATION

Pollutant/ Exposure	Federal Primary Standard	Federal Secondary Standard	Project Increment	Ambient Air Quality Impacts	
				Background	Total
Nitrogen Dioxide (NO$_X$)					
Annual	100	100	3	38	41
Sulfur Dioxide (SO$_2$)					
Annual	78	-	0	26	26
24-hour	365	-	0	183	183
TSP					
3 hour	-	1,300	0	550	550
Carbon Monoxide					
8 hour	10,000	10,000	2	9,000	9,002
1 hour	40,000	40,000	3	17,000	17,003
Total Suspended Part (TSP)					
Annual	75	60	0	52	52
24-hour	260	150	0	211	211
Inhalable Part. (PM-10)					
24-hour	150	-	0	105 1/	105

Table 4.2-4 (continued)

AIR QUALITY IMPACT ANALYSIS, HENDERSON COMPRESSION STATION

Pollutant/ Exposure	Nevada Standard	Federal Primary Standard	Federal Secondary Standard	Project Increment	Ambient Air Quality Impacts Background	Total
Nitrogen Dioxide (NO_x)						
Annual	100	100	100	6	58	64
Sulfur Dioxide (SO_2)						
Annual	80	78	-	0	28	28
24-hour	365	365	-	0	110	110
TSP						
3 hour	-	-	1,300	0	175	175
Carbon Monoxide						
8 hour	10,000	10,000	10,000	4	22,000	22,004
1 hour	40,000	40,000	40,000	6	29,000	29,006
Total Suspended Part (TSP)						
Annual	75	75	60	0	101	101
24-hour	-	260	150	0	1019	1019
Inhalable Part. (PM-10)						
24-hour	150	150	-	0	510 1/	510

Table 4.2-4 (continued)

AIR QUALITY IMPACT ANALYSIS, TOPOCK COMPRESSION STATION

Pollutant/ Exposure	Federal Primary Standard	Federal Secondary Standard	Project Increment	Ambient Air Quality Impacts Background	Total
Nitrogen Dioxide (NO_x)					
Annual	100	100	7	31	38
Sulfur Dioxide (SO_2)					
Annual	78	-	0	27	27
24-hour	365	-	0	42	42
TSP					
3 hour	-	1,300	0	115	115
Carbon Monoxide					
8 hour	10,000	10,000	4	8,000	8,004
1 hour	40,000	40,000	6	19,000	19,006
Total Suspended Part (TSP)					
Annual	75	60	0	93	93
24-hour	260	150	0	215	215
Inhalable Part. (PM-10)					
24-hour	150	-	0	108 1/	108

1/ = Estimated at 50% of TSP

Table 4.2-5

SIGNIFICANT GEOLOGICAL HAZARDS, WYCAL PIPELINE PROPOSAL

Mile-post	Location	Liquefaction/ Ground Failure	Surface Fault Rupture	Slope Instability	Ground Subsidence	Flash Flooding	Avalanche
Northern Leg							
84-95	Mainline	–	–	X	–	–	–
119-128	Mainline	–	–	X	–	–	–
136-156	Mainline	–	–	–	–	–	X
133-157	Mainline	–	–	X	–	–	–
158-163	Thistle Slide	–	–	X	–	–	–
170-180	Mainline	–	–	X	–	–	–
188-191	Mainline	–	–	X	–	–	–
194-196	Nephi Wasatch Fault	–	X	–	–	–	–
196-230	Mainline	X	–	–	–	–	–
240-605.5	Mainline	–	–	–	–	X	–
288-391	Mainline	–	–	X	–	–	–
320-333	Mainline	–	–	X	–	–	–
416-501	Mainline	–	–	–	X	–	–
Transwestern Supply Line							
1-16.5	Mojave Valley	–	–	–	–	X	–
Western Leg							
1	Colorado River floodplain near Topock, AZ	X	–	–	–	–	–
1-230	Mojave Desert	–	–	–	–	X	–

Table 4.2-5 (continued)

SIGNIFICANT GEOLOGICAL HAZARDS, WYCAL PIPELINE PROPOSAL

Mile-post	Location	Liquefaction/ Ground Failure	Surface Fault Rupture	Slope Instability	Ground Subsidence	Flash Flooding	Avalanche
98	Ludlow fault, west of Hector	–	X	–	–	–	–
120	Pisgah fault, west of Hector	–	X	–	–	–	–
142	Calico fault, northeast of Yermo	–	X	–	–	–	–
147	Mojave River alluvium	X	–	–	–	–	–
152	Harper fault, north of Barstow	–	X	–	–	–	–
159	Unnamed fault near Barstow	–	X	–	–	–	–
165	Lockhart fault, southeast of Lockhart	–	X	–	–	–	–
180	South Lockhart fault, east of Kramer Junction	–	X	–	–	–	–
234	Garlock fault, west of Mojave	–	X	X	–	–	–
248-350	Cummings Valley and Brite Valley in Tehachapi Mountains Chanac Creek	X	–	X	–	–	–
253-256	Tejon Creek Valley	X	–	X	–	–	–
Taft Lateral							
0-2	Tejon Creek Valley	X	–	X	–	–	–
4-34	San Joaquin Valley	–	–	–	X	–	–
12	White Wolf fault, south of Mettler	–	X	–	–	–	–

Table 4.2-5 (continued)

SIGNIFICANT GEOLOGICAL HAZARDS, WYCAL PIPELINE PROPOSAL

Mile-post	Location	Liquefaction/ Ground Failure	Surface Fault Rupture	Slope Instability	Ground Subsidence	Flash Flooding	Avalanche
4-63	Southern San Joaquin Valley	X	–	–	X	–	–
44	Buena Vista fault, north of Ford City	–	X	–	–	–	–
Kern Lateral							
0-30	Southern San Joaquin Valley	X	–	–	X	–	–
8-12	White Wolf fault, south of Arvin	–	X	–	–	–	–
21-26	Edison fault, northeast of Edison	–	X	–	–	–	–
39	Mt. Poso fault, north of Bakersfield	–	X	–	–	–	–
39-44	Pond-Poso Creek fault, north of Bakersfield	–	X	–	–	–	–
43	Kern Front fault, north of Bakersfield	–	X	–	–	–	–

Table 4.2-6

DISTRIBUTION OF POTENTIAL SOILS IMPACTS, WYCAL PIPELINE PROPOSAL

		Erosion Potential 1/						Reclamation Potential 2/ (miles) 3/		
		Water (miles) 3/			Wind (miles) 3/					
Milepost	Geographic Area	L	M	H	L	M	H	G	F	P
NL 0-24.0	Wyoming Basin	18.0	5.0	1.0	0.0	24.0	0.0	3.0	11.0	10.0
NL 24.0-195.0	Middle Rocky Mtns.	47.0	69.0	55.0	81.0	90.0	0.0	4.0	106.0	61.0
NL 195-400.0	Basin and Range	155.0	38.0	12.0	90.0	115.0	0.0	61.0	94.0	50.0
NL 400-606.0	Mojave Desert	138.0	50.0	18.0	90.0	89.0	27.0	14.0	38.0	154.0
TSL 0-16.5	Mojave Desert	5.0	6.5	5.0	5.0	0.0	11.5	0.0	3.0	13.5
WL 0-228.0	Mojave Desert	224.0	3.0	1.0	1.0	50.0	177.0	6.0	40.0	182.0
WL 228.0-256.0	Tehachapi Mtns.	7.0	5.0	16.0	1.0	24.0	3.0	3.0	6.0	19.0
WL 256.0-325.0	San Joaquin Valley	62.0	5.0	2.0	13.0	54.0	2.0	63.0	3.0	3.0
KL 0-44	San Joaquin Valley	30.0	9.0	6.0	20.0	20.0	5.0	27.0	11.0	7.0

1/ Water Erosion Potential
L(low) = less than 5 tons/acre/year (low probability for significant erosion impacts).
M(moderate) = 5 to 20 tons/acre/year (near even probability for significant erosion impacts).
H(high) = greater than 20 tons/acre/year (high probability for significant erosion impacts).

Wind Erosion Potential
L(low) = low probability for significant erosion impact.
M(moderate) = near even probability for significant erosion impacts. Impact potential also dependent upon site specific exposure to prevailing winds.
H(high) = high probability for significant erosion impacts. Impact potential also dependent upon site specific exposure to prevailing winds.

2/ Reclamation Potential (Ratings are based upon trenching with no selective soil handling or other mitigation)
G(good) = good probability for restoring vegetation which will support pre-existing land use. Productivity potential may be somewhat reduced.
F(fair) = near even probability for restoring vegetation which will support pre-existing land use within short periods of time. Time needed for re-establishment is likely to be longer than soils with good potential. Productivity potential may be reduced.
P(poor) = low probability for restoring vegetation which will support pre-existing land use within a short period of time. Time needed for re-establishment is likely to be long. Productivity potential may be reduced.

3/ Cumulative miles for pipeline segment.

4.2.4 Surface Water

The three perennial streams crossed by the WyCal route within the Wyoming Basin have low to moderate ratings for both channel gradient and sideslope as indicated in Table 3.1-2. The two perennial stream crossings located in the Middle Rocky Mountains Region have high sensitivity ratings for both channel gradient and sideslope, as identified in Table 3.1-2. The general discussion on impacts to water resources presented in FEIR/S, II/4.2.4.1.1 and II/4.2.4.1.2 applies to these crossings. It is unlikely that surface water resources would be significantly impacted.

The impacts discussed in FEIR/S, II/4.2.4.1.2, II/4.5.4, I/4.2.4, I/4.7.1.4 also apply to the remainder of this proposal.

Table 2.2-3 lists the amounts of water and permits required for hydrostatic testing. Since the location of the hydrostatic test water sources has not been specified, the exact location and magnitude of impacts associated with hydrostatic test water cannot be assessed. The discussion presented on impacts related to hydrostatic testing in FEIR/S, II/4.2.4 applies to this proposal.

4.2.5 Groundwater

No potential impacts to groundwater through MP 54.4 of the proposed route were identified. Impacts along the remainder of the proposed route are described in FEIR/S, II/4.2.5, I/4.2.5, and I/4.7.5.

4.2.6 Freshwater Biology

See FEIR/S, II/4.2.6 for discussion of the general impacts on aquatic resources that could result from pipeline construction and criteria used to delineate significant impacts.

Impacts on aquatic communities along the WyCal mainline route are presented in Table 4.2-7. The general impacts discussion in FEIR/S, II/4.2.6.1 and II/4.2.6.2 also apply to this section of the WyCal route. No aquatic resources would be significantly impacted within ~~this~~ the Wyoming Basin region.

Table 4.2-7

SIGNIFICANCE OF IMPACTS ON AQUATIC COMMUNITIES,
WYCAL PIPELINE PROPOSAL

State	County	Stream	Approximate Milepost	Impacts[1]
Wyoming Basin Region (NL 0-38)				
Wyoming	Uinta	Hams Fork	0.9	NS
		Little Muddy Creek	18.9-19.1	NS
		Little Muddy Creek	24.1	NS
Middle Rocky Mountains Region (NL 38-195)				
Wyoming	Uinta	Pleasant Valley Creek	49.5	NS
		Pleasant Valley Creek (Tributary)	49.6	NS
		Bear River	58.8	S
		Coyote Creek	63.6	NS
		Clifton Hollow	65.7	NS
		Sage Creek Draw	68.4	NS
		Yellow Creek	70.8	NS
		Basin Creek	74.5	NS
Utah	Summit	Chalk Creek	77.9	NS
		East Fork Chalk Creek	80.5	NS
		Fish Creek	84.5	NS
		South Fork Chalk Creek	89.4	NS
		Whites Creek	98.5	S
		Weber River	100.3	NS
		Beaver Creek	106.3	S
	Wasatch	Provo River	110.2	S
		Lake Creek	120.5-122.9	S
		Strawberry River	124.5-131.6	S
		Wide Hollow	125.3	NS
		Mill B Canyon	127.3	S
		Strawberry River	129.4	S
		Bjorkman Hollow	130.4	NS
		Strawberry River	131.4	S
		Hobble Creek	132.9	NS
	Utah	Wanrhodes Canyon	152.0	S
		Little Diamond Creek	153.0	S
		Diamond Fork	156.6	NS
		Diamond Fork	157.6	NS
		Spanish Fork	159.2	S
		Crab Creek	162.4	NS
		Anderson Hollow	165.1	NS
		Bennie Creek	166.3	S
		Nebo Creek	169.8	NS

Table 4.2-7 (continued)

SIGNIFICANCE OF IMPACTS ON AQUATIC COMMUNITIES,
WYCAL PIPELINE PROPOSAL

State	County	Stream	Approximate Milepost	Impacts[1]
	Juab	Hop Creek	185.6	S
		Salt Creek	186.6	S
		Salt Creek	190.6	S
		Basin and Range Region (NL 195-400)		
Utah	Juab	Chicken Creek	205.4-20.47	NS
		Sevier River	208.1	NS
	Washington	Holt Canyon	372.2	NS
		Spring Creek	374.4	NS
		Magotsu Creek	384.3	NS
		Moody Wash	387.3	NS
		Mojave Desert Region (NL 400-605.5, TSL 0-16.5, WL 0-228)		
Nevada	Clark	Muddy River	NL 457.1	NS
		Las Vegas Wash	NL 497.2	NS
		Colorado River	WL 1.2	S
		San Joaquin Valley (KL 0-40)		
California	Kern	Kern River	KL 32	NS
		Poso Creek	KL 39-43	NS

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[1] S = significant
NS = not significant

4.2.7 Terrestrial Biology

4.2.7.1 Vegetation

Refer to FEIR/S, II/4.2.7.1 for criteria used to determine the significance of impacts that would occur to the vegetation resources due to pipeline construction, operation, and abandonment. In addition, that section includes a discussion on general impacts that could occur to vegetation resources as a result of pipeline construction. Table 4.2-8 lists the cumulative area of each vegetation type that would be denuded due to pipeline construction along the WyCal pipeline, including portions previously examined under the Kern River and Mojave proposals.

General Vegetation. For the portion of the route located within the Wyoming Basin Region (NL 0-38), no Class I impacts would occur. Approximately 1.4 acres of wetland/riparian vegetation would be impacted (Class II). Disturbance of 145.5 acres of sagebrush scrub and 313.7 acres of mixed desert scrub would be considered a Class III impact. For the portion of the line within the Middle Rocky Mountains Region (NL 38-54.4), approximately 36.4 acres of pinyon-juniper woodland and 157.6 acres of mountain brush vegetation (Class III) would be crossed. No Class I impacts would occur.

Plant Species of Special Concern. See discussion in FEIR/S, II/4.2.7.1.1 for impacts on plant species of special concern.

The total area of disturbance by vegetation type for the portion of the mainline within this region would involve Class III impacts to 854.6 acres of mountain brush, 290.9 acres of sagebrush scrub, and 157.6 acres of pinyon-juniper woodlands, and Class II impacts to 472.7 acres of montane forest, 48.5 acres of agricultural land, and 78.7 acres of wetland/riparian.

4.2.7.2 Wildlife

Potential impacts to wildlife associated with the construction of the proposed WyCal natural gas pipeline can be grouped into four categories: 1) direct impacts to individuals or populations incurred during the construction phase; 2) direct impacts to wildlife habitat; 3) indirect impacts associated with increased access; and 4) residual impacts associated with operation of the pipeline. FEIR/S, II/4.2.7.2 provides a discussion of each of these impact categories.

Criteria used to delineate significant levels of potential impacts is presented in this same section (FEIR/S, II/4.2.7.2).

Significant impacts to general wildlife are identified in Table 4.2-9. A summary of significant impacts to wildlife along the entire route is presented in Table 4.2-10. Table 3.1-11 in

Table 4.2-8

VEGETATION TYPES AND DENUDED ACREAGES, WYCAL PIPELINE PROPOSAL

			Denudation [1] (Acres)			
Geographic Region	Vegetation Type	Impact [2] Class	Short Term [3]	Long Term [4]	Permanent [5]	Total
		NORTHERN LEG				
Wyoming Basin	Mixed desert scrub	III	313.7	0	0	313.7
	Sagebrush scrub	III	145.5	0	0	145.5
	Wetland/riparian	II	1.4	0	0	1.4
		Subtotal	460.6	0	0	460.6
Middle Rocky Mountain (Wasatch Mountains)	Sagebrush scrub	III	290.9	0	0	290.9
	Pinyon-Juniper woodland	III	78.8	78.8	0	157.6
	Montane forest	II	236.3	236.4	0	472.7
	Agricultural land	II	48.5	0	0	48.5
	Mountain brush	III	427.3	427.3	0	854.6
	Wetland/riparian	II	78.7	0	0	78.7
		Subtotal	1160.5	742.5	0	1903.0
Basin and Range	Mixed desert scrub	III	133.3	0	0	133.3
	Agricultural land	II	400.0	0	0	400.0
	Sagebrush scrub	III	1127.3	0	0	1127.3
	Utah grassland	III	169.7	0	0	169.7
	Pinyon-Juniper woodland	III	266.6	266.7	0	533.3
	Blackbrush scrub	I	0	0	97.0	97.0
	Wetland/riparian	II	24.2	0	0	24.2
		Subtotal	2121.1	266.7	97.0	2484.8
Mojave Desert	Blackbrush scrub	I	0	0	472.7	472.7
	Joshua tree woodland	I	0	0	278.8	278.8
	Mojavean creosote bush scrub	I	0	0	1526.1	1526.1
	Agricultural land	I	24.2	0	0	24.2
	Desert saltbush scrub	I	0	0	169.7	169.7
	Wetland/riparian	II	9.9	9.5	0	19.4
		Subtotal	34.1	9.5	2447.3	2490.9
COMPRESSOR STATIONS:						
Station No.1 (Wyoming basin)	Mixed desert scrub	III	0	45.0	0	45.0
Station No. 3 (Basin and Range)	Utah grassland	III	0	45.0	0	45.0
Station No. 5 (Mojave Desert)	Joshua tree woodland/Mojavean creosote bush scrub	I	0	0	45.0	45.0
		Subtotal	0	90	45.0	135.0
Summary by Vegetation Type						
	Mixed desert scrub	III	447.0	0	0	447.0
	Sagebrush scrub	III	1563.7	0	0	1563.7
	Pinyon-juniper woodland	III	345.4	345.5	0	690.9
	Wetland/riparian	II	114.2	9.5	0	123.7
	Montane forest	II	236.3	236.4	0	472.7
	Agricultural land	II	472.7	0	0	472.7
	Mountain brush	III	427.3	427.3	0	854.6

Table 4.2-8 (continued)

VEGETATION TYPES AND DENUDED ACREAGES, WYCAL PIPELINE PROPOSAL

Geographic Region	Vegetation Type	Impact Class 2/	Denudation 1/ (Acres) Short Term 3/	Long Term 4/	Permanent 5/	Total
Summary by Vegetation Type (continued)						
	Utah grassland	III	169.7	0	0	169.7
	Blackbrush scrub	I	0	0	569.7	569.7
	Joshua tree woodland	I	0	0	278.8	278.8
	Mojavean creosote bush scrub	I	0	0	1526.1	1526.1
	Desert saltbush scrub	I	0	0	169.7	169.7
		TOTAL	3776.3	1018.7	2544.3	7339.3
Summary by Impact Class						
	Class	I	0	0	2544.3	2544.3
	Class	II	823.2	245.9	0	1069.1
	Class	III	2953.1	772.8	0	3725.9
	Class	IV	0	0	0	0
		TOTAL	3776.3	1018.7	2544.3	7339.3
		Transwestern Supply Lateral				
Mojave Desert	Mojavean creosote bush scrub	I	0	0	193.9	193.9
	Wetland/riparian	II	6.1	0	0	6.1
		Subtotal	6.1	0	193.9	200.0
		WESTERN LEG				
Mojave Desert	Mojavean creosote bush scrub	I	0	0	1935.6	1935.6
	Wetland/riparian	II	6.1	0	0	6.1
	Teddybear cholla 8/	I	0	0	35.1	35.1
	Stabilized and partially stabilized desert dunes	I	0	0	23.0	23.0
	Agricultural land	II	167.3	0	0	167.3
	Joshua tree woodland	I	0	0	174.5	174.5
	Mojave saltbush 6/	I	0	0	421.8	421.8
		Subtotal	173.4	0	2590.0	2763.4
Tehachapi Mtns.	Mojavean juniper woodland and scrub	I	0	0	48.5	48.5
	Digger pine-oak woodland	II	0	0	237.4	237.4
	Valley and foothill grassland	III	53.3	0	0	53.3
	Wetland/riparian 7/	II	0.2	0	0	0.2
		Subtotal	53.5	0	285.9	339.4
San Joaquin Valley	Valley and foothill Grassland	III	60.5	0	0	60.5
		Subtotal	60.5	0	1	60.5
		Taft Lateral				
San Joaquin Valley	Agricultural land	II	387.2	0	0	387.2
	Valley and foothill grassland	III	375.1	0	0	375.1
	Wetland/riparian 7/	II	0.1	0	0	0.1
		Subtotal	762.4	0	0	762.4

Table 4.2-8 (continued)

VEGETATION TYPES AND DENUDED ACREAGES, WYCAL PIPELINE PROPOSAL

			Denudation[1] (Acres)			
Geographic Region	Vegetation Type	Impact[2] Class	Short Term[3]	Long Term[4]	Permanent[5]	Total
		Kern Lateral				
San Joaquin Valley	Agricultural land	II	267.9	0	0	267.9
	Valley and foothill grassland	III	231.5	0	0	231.5
	Wetland/riparian[7]	II	46.1	0	0	46.1
		Subtotal	545.5	0	0	545.5
		TOTAL	1601.4	0	3069.8	4671.2
Summary of Vegetation Type						
	Mojavean creosote bush scrub	I	0	0	2129.5	2129.5
	Wetland/riparian	II	58.6	0	0	58.6
	Teddybear cholla[8]	I	0	0	35.1	35.1
	Stabilized and partially stabilized desert dunes	I	0	0	23.0	23.0
	Agricultural land	II	822.4	0	0	822.4
	Joshua tree woodland	I	0	0	174.5	174.5
	Mojave saltbush[6]	I	0	0	421.8	421.8
	Mojavean juniper woodland and scrub	I	0	0	48.5	48.5
	Digger pine-oak woodland	II	0	0	237.4	237.4
	Valley and foothill grassland	III	720.4	0	0	720.4
		TOTAL	1601.4	0	3069.8	4671.2
Summary by Impact Class[2]						
	Class	I	0	0	2832.4	2832.4
	Class	II	881.0	0	237.4	1118.4
	Class	III	720.4	0	0	720.4
	Class	IV	0	0	0	0
		TOTAL	1601.4	0	3069.8	4671.2
		ENTIRE MAINLINE				
Summary by Vegetation Type						
	Mixed desert scrub	III	447.0	0	0	447.0
	Sagebrush scrub	III	1563.7	0	0	1563.7
	Pinyon-juniper woodland	III	345.4	345.5	0	690.9
	Wetland/riparian	II	172.8	9.5	0	182.3
	Montane forest	II	236.3	236.4	0	472.7
	Agricultural land	II	1295.1	0	0	1295.1
	Mountain brush	III	427.3	427.3	0	854.6
	Utah grassland	III	169.7	0	0	169.7
	Blackbrush scrub	I	0	0	569.7	569.7
	Joshua tree woodland	I	0	0	453.3	453.3
	Mojavean creosote bush scrub	I	0	0	3655.6	3655.6
	Desert saltbush scrub	I	0	0	169.7	169.7
	Teddybear cholla[8]	I	0	0	35.1	35.1
	Stabilized and partially stabilized desert dunes	I	0	0	23.0	23.0

Table 4.2-8 (continued)

VEGETATION TYPES AND DENUDED ACREAGES, WYCAL PIPELINE PROPOSAL

Geographic Region	Vegetation Type	Impact Class[2]	Denudation[1] (Acres) Short Term[3]	Long Term[4]	Permanent[5]	Total
Summary by Vegetation Type (continued)						
	Mojave saltbush[6]	I	0	0	421.8	421.8
	Mojavean juniper woodland and scrub	I	0	0	48.5	48.5
	Digger pine-oak woodland	II	0	0	237.4	237.4
	Valley and foothill grassland	III	720.4	0	0	720.4
		TOTAL	5377.7	1018.7	5614.1	12010.5
Summary by Impact Class[2]						
	Class	I	0	0	5376.4	5376.7
	Class	II	1704.2	245.9	237.4	2187.5
	Class	III	3673.5	772.8	0	4446.3
	Class	IV	0	0	0	0
		TOTAL	5377.7	1018.7	5614.1	12010.5

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[1] vegetation loss assuming a 100-foot wide construction ROW and a 50-foot wide operational ROW.

[2] see definitions in section 4.2.7.1 of the FEIR/S, II.

[3] short-term loss = vegetation loss within community types with fair or better revegetation potential; vegetation loss within total 100-foot wide construction ROW if large woody shrubs or trees not present; vegetation loss short term within the 50-foot wide portion of the construction ROW not used for operation with large woody shrubs and trees present; vegetation loss would not be significant.

[4] long-term loss = loss of vegetation within community types with fair or better revegetation potential containing large woody shrubs or trees present in operational ROW (50-foot wide) which would hamper operations and, therefore, would not be allowed to reestablish in the operational ROW during the life of the project; loss would not be significant.

[5] permanent loss = loss of vegetation within community types with poor or worse revegetation potential; vegetation loss would be significant.

[6] Western Mojave Desert Mojave Saltbush Unusual Plant Assemblage [BLM 1980].

[7] contains Great Valley mixed riparian forest.

[8] Sacramento/Stepladder Mountains Teddybear Cholla Unusual Plant Assemblage [BLM, 1980].

Table 4.2-9

SIGNIFICANT WILDLIFE IMPACTS, WYCAL PIPELINE PROPOSAL

Wildlife groups and life requisites impacted 1/

Milepost	Wintering 3/ big game	Migrating 3/ big game	Calving/ 3/ fawning big game	Nesting/ breeding sage grouse	Upland 2/ game bird critical habitat	Nesting/ brooding waterfowl	Nesting raptors
0-20	P	-	-	-	SC	-	3 nests
21-40	P,MD	-	-	X 4/	-	-	4 nests
41-60	MD	-	-	-	-	-	2 nests
61-80	M,MD	-	-	-	-	-	-
81-100	M,E,MD	M,E,MD	-	-	-	-	-
101-120	E,MD	MD	-	-	-	-	-
121-140	E,MD	-	-	-	-	-	-
141-160	E,MD	-	-	X	-	-	4 nests
161-180	E,MD	-	E	-	-	-	2 nests
181-200	E,MD	-	-	-	-	-	1 nest
201-220	E,MD	-	-	-	-	X 4/	1 nest
221-240	E,MD	-	-	-	CQ	-	-
241-260	E	-	-	-	P,CQ	-	2 nests
261-280	MD	-	-	-	-	-	-
281-300	MD	-	-	X	-	-	-
301-320	MD	-	-	X	-	-	-
321-340	MD	-	-	X	-	-	-
341-360	MD	-	-	-	-	-	1 nest
361-380	MD	-	MD	-	-	-	-
381-400	MD	-	-	-	-	-	-
401-420	MD	-	-	-	-	-	-
421-440	-	-	-	-	GQ	-	-

1/ Impacts are delineated by species, where possible, and include both habitat and population related impacts unless specifically stated in the table.

2/ Game birds include sandhill crane (SC), California quail (CQ), and ring-necked pheasant (P) in Utah; and Gambel's quail (GQ) in Nevada.

3/ Big game species include mule deer (MD), elk (E), moose (M) and pronghorn (P).

4/ An "X" signifies that an impact occurs within the milepost designation

Section 3.1.7.2 lists the presence of species of special concern within each state traversed by the proposed route.

General Wildlife. FEIR/S, II/4.2.7.2.1 provides explanatory narrative for classifying individual wildlife impacts, and are relevant to this supplement. A quantification of impacts follows.

Class II
- 14.4 miles of potential disturbance of wintering big game.
- 3.9 miles of sage grouse nest disturbance.
- 0.6 mile of sandhill crane breeding/nesting disturbance.
- Nine raptor nests potentially disturbed.

Class III
- Waterfowl nest destruction
- Disturbance of approximately 175 acres of big game critical winter range.

Table 4.2-10

SUMMARY OF SIGNIFICANT WILDLIFE IMPACTS, WYCAL PIPELINE PROPOSAL

Wildlife Class	Impact to 1/ 3/ Individuals	Impact to 3/ Habitat
Game Species 2/	175 miles (II)	146 acres (I) 146 acres (II)
Raptors	18 nesting pairs	1 nest (II)
Species of Special Concern 4/	254 miles (I) 31 miles (II)	4005 acres (I) 430 acres (II) 1 bald eagle roost (II) 1 kit fox natal den (II)

1/ Impacts to individuals are quantified by cumulative miles of proposed pipeline where impacts would occur.

2/ Game species include ungulate big game, upland game birds, and waterfowl.

3/ Indicates impact class: I= Significant adverse impact that could not be mitigated or avoided; II= Significant adverse impact that could be feasibly mitigated or avoided.

4/ Species of Special Concern include all federally listed species, candidates for listing, state listed species and BLM sensitive species. Because of the speculative nature of impacts to black-footed ferrets and California condors, they have been excluded from this table.

Wildlife Species of Special Concern. A discussion of impacts to the federally endangered black-footed ferret is presented in FEIR/S, II/4.2.7.2.1. For the WyCal project, the USFWS has reaffirmed its previous position in the Biological Opinion for the Kern River and Mojave projects (FEIR/S, II/Appendix G) that should the WyCal (or any other applicant's) pipeline be certificated, it would have to comply with all provisions of their Biological Opinion, including the incidental take portions, in order to be in compliance with the Endangered Species Act. These provisions were adopted by staff as mitigation measures in Vol. III of the FEIR/S. WyCal has also stated that they will adopt these measures as they apply to species of special concern. Approximately 640 acres of potential ferret habitat occurs within the analysis corridor. The proposed ROW crosses one mile of this habitat. The potential exists for a Class II impact to ferrets.

Bald eagle winter concentrations or roost sites would not be affected by the proposed pipeline.

4.2.7.3 Grazing

A discussion of types of impacts to grazing is discussed in FEIR/S, I/4.2.7.3, I/4.7.1.7.3, and II/4.2.7.3. This narrative also describes criteria used to develop significance levels of potential impacts, and the assumptions necessary to assess these impacts.

The potential for significant impact to grazing allotments does exist within USFS allotments in Utah based on the steep terrain, high elevation, a short growing season, and the livestock classes utilizing the allotments. Some adverse impacts are anticipated along other allotments where introduction and spread of noxious weeds, separation of livestock from developed water sources, changes to normal trailing patterns, and loss of forage could occur. It is not possible to predict where these potential significant or adverse impacts would occur prior to staking the ROW.

4.2.8 Socioeconomics

4.2.8.1 Population, Housing, and Economic Impacts

The impacts of the WyCal project in terms of employment, population, income, and tax revenues are all positive, although generally insignificant and of short duration. Several counties will receive measurable changes in local assessed value relative to current levels. This result comes about due to the virtual lack of any existing tax base in these counties. While changes in tax receipts are generally viewed as positive, careful public finance planning will be necessary in certain cases.

Methods used in the WyCal assessment for the determination of impact significance employed the same procedures and criteria as those used in the study of previously analyzed proposals (see FEIR/S, I/4.2.8).

There will be significant effects from this project as a result of the demands for housing. In many cases, the demand for certain types of housing will be more than three times available supply. In these cases, it is expected that workers will seek alternative forms of housing or will travel greater distances to work on the project. Alternatively, workcamps will be set up.

Table 4.2-11 presents aggregate socioeconomic data for this project. Very little information was available about local expenditures, the numbers of construction workers or crews, or housing demand by type. It is anticipated that approximately 12 construction spreads will be used and the spread in Wyoming will have on the order of 450 workers (Exhibit Z, pages 3 and 9, Environmental Report, WyCal application). In addition, it was noted that 6 to 8 persons would be required to operate each compressor, and a workforce of 4,900 would be required for the construction of the WyCal project (responses to questions 211 and 239 posed by Southern California Gas Company, Docket No. CP87-479-000). These data provided only limited guidance toward the calculation of socioeconomic impacts.

Based on WyCal's figures, ~~and pipeline operation numbers from the FEIR/S,~~ an estimated ~~164~~ 45 persons will be employed to operate the pipeline.

It is estimated that a total of $30.995 million will be spent by non-local construction personnel based on an average local expenditure per non-resident worker of $68.50 per day. Construction workers from local labor forces are estimated to spend most of their earnings in their local areas, totalling $31.887 million, based on daily earnings of $145.60.

While the local purchases by the contractors and construction personnel will generate some revenues in the form of sales tax, and income taxes will be generated on earnings by the workers, the main source of contributions to local tax receipts will be changes in the assessed value of local property. Table 4.2-12 presents the changes in assessed value in each county in the study region.

As seen in Table 4.2-12, several counties will receive substantial increases in assessed value. The tax base in Beaver and Juab counties in Utah is estimated to increase over 50 percent, and the tax bases in Lincoln County, Nevada, and Wasatch County, Utah are shown to increase over 25 percent. This pipeline project would represent a significant contribution.

Table 4.2-11

AGGREGATE SOCIOECONOMIC IMPACT INFORMATION, WYCAL PIPELINE PROPOSAL

	Spreads										Compressor Stations			
Characteristic	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	Anschutz	Black Rock	Henderson	Topock
Location	Lincoln, Uinta, WY	Summit, Wasatch, Utah, UT	Utah, Juab, Sanpete, UT	Millard, Beaver, UT	Washington, Iron, UT	Lincoln, Clark, NV	San Bern, CA	San Bern/ Kern, CA	Kern, CA	Mohave, AZ	Uinta, WY	Millard, UT	Clark, NV	Mohave, AZ
Length (miles)	85	82	71	99	98	173	165	130	97	17	n/a	n/a	n/a	n/a
Construction Duration (days)	70	193	140	74	135	130	126	103	213	60	150	150	150	150
Construction Crew	497	431	434	503	429	457	488	486	376	230	145	145	145	145
Other Peronnel Required for Construction	36	31	31	36	31	33	35	35	27	21	11	11	11	11
Local Construction Personnel	174	151	152	176	150	160	171	170	132	80	51	51	51	51
Non-local Construction Personnel	359	311	313	363	310	330	352	351	271	171	105	105	105	105
Dependents of Non-local Personnel	108	93	94	109	93	99	106	105	81	51	32	32	32	32
Total Immigrant Population	466	405	407	472	403	429	458	456	353	222	137	137	137	137
Housing Demand by Immigrants (Units):														
Hotel/Motels	154	134	135	156	133	142	152	151	117	74	45	45	45	45
Rental Units	100	87	88	102	87	92	99	98	76	48	29	29	29	29
R/V Campers	97	84	85	98	84	89	95	95	73	46	28	28	28	28
Other	7	6	6	7	6	7	7	7	5	3	2	2	2	2
Local Expenditures by Non-local Construction Personnel	$1,727,164	$4,106,738	$3,002,444	$1,848,324	$2,855,033	$2,941,104	$3,041,802	$2,475,005	$3,968,351	$702,810	$1,081,444	$1,081,444	$1,081,444	$1,081,444
Local Expenditures by Local Construction Personnel	$1,779,652	$4,231,542	$3,093,689	$1,904,494	$2,941,797	$3,030,484	$3,134,243	$2,550,220	$4,088,949	$698,880	$1,108,380	$1,108,380	$1,108,380	$1,108,380
Local Expenditures by Contractors	$444,374	$428,690	$371,183	$517,565	$512,337	$904,432	$864,054	$680,198	$505,098	$33,000	$1,476,500	$1,476,500	$1,476,500	$1,476,500

Table 4.2-12

CONTRIBUTION TO COUNTY TAX BASE, WYCAL PIPELINE PROPOSAL

State/County	Length of Line (miles) Facilities	Estimated Taxable Value of Pipeline and Facilities (Millions)	Total 1984/85 County Assessed Value (Millions)	Pipeline Percentage of Total Value	1984/1985 County Tax Revenues (Millions)
ARIZONA					
Mohave	17 Compressor	$24.0	$377.7	6.35	$36.2
CALIFORNIA					
Kern	176	81.7	31,451.7	0.26	293.3
San Bernardino	216	145.0	30,598.6	0.47	350.8
NEVADA					
Clark	150 Compressor	93.7	7518.2	1.25	139.6
Lincoln	23	12.9	46.4	27.88	1.5
UTAH					
Beaver	34	19.1	34.2	55.92	1.4
Iron	49	27.6	113.3	24.33	6.4
Juab	45	25.3	44.1	57.40	2.3
Millard	65 Compressor	44.1	296.2	14.90	2.1
Sanpete	6	3.4	63.7	5.30	0.8
Summit	37	20.8	663.7	3.14	21.1
Utah	39	21.9	842.5	2.60	50.3
Wasatch	26	14.6	57.4	25.48	3.1
Washington	49	27.6	180.5	15.27	8.8
WYOMING					
Lincoln	25	9.2	297.1	3.10	20.3
Uinta	60 Compressor	40.3	945.5	4.26	61.0

Source: Value of pipeline and facilities are based on Exhibit K "Cost of Facilities", from the WyCal application. Cost estimates were disaggregated to specific counties based on the amount of pipeline to be laid in each County. Compressor and meter station values were assigned by location of the facility. Local tax and value information was obtained from the California State Board of Equalization, Utah State Auditor's Office, Clark County Nevada Comptroller, Wyoming County Treasurer's Office, and the Arizona State Department of Revenue.

Table 4.2-13

HOUSING DEMAND DISTRIBUTION BY AFFECTED AREA, WYCAL PIPELINE PROPOSAL

State/County 1/ City	Temporary Housing									Permanent Housing
	Hotel/Motel Rooms			Rental Units			RV Spaces			
	Supply	Demand	%	Supply	Demand	%	Supply	Demand	%	
ARIZONA										
Mohave	20	1	5	811						1,459
Kingman	1,480	18	1	64	5	8	328	9	3	116
Lake Havasu City	1,650	41	2	153	33	22	1,114	65	6	275
CALIFORNIA										
Kern	495	41	8	4,478			289	88	30	6,591
Bakersfield	2,758	227	8	975	174	18	264	80	30	1,435
San Bernardino	12	1	8	9,933			253	42	17	19,833
Barstow	1,350	186	14	94	107	114	238	47	20	187
Needles	580	80	14	29	33	112	440	86	20	59
Victorville	688	36	5	133	57	43	203	15	7	266
NEVADA										
Clark	1,375	4	0	8,247			154	5	3	12,187
Henderson	625	2	0	458	14	3	0	0	**	677
Las Vegas	53,600	136	0	2,577	78	3	2,675	84	3	3,807
Lincoln	0	187	**	84	121	144	12	117	975	105
UTAH										
Beaver	0	156	**	30	102	340	365	98	27	50
Davis	0	0	**	450	0	0	460	0	0	1,131
Iron	0	0	**	128			0	0	**	243
Cedar City	400	133	33	42	87	208	163	84	52	79
Juab	0	291	**	66	190	288	0	183	**	104
Millard	0	201	**	46	131	285	53	126	238	100
Morgan	0	0	**	4	0	0	0	0	**	16
Rich	0	0	**	23	0	0	0	0	**	30
Salt Lake				5,343						9,429
Salt Lake City	10,000	0	0	2,241	0	0	641	0	0	3,956
Sanpete	0	135	**	89	88	99	140	85	61	177
Summit	0	188	**	322	187	58	199	181	91	427
Tooele	0	0	**	260	0	0	0	0	**	374

Table 4.2-13 (continued)

HOUSING DEMAND DISTRIBUTION BY AFFECTED AREA, WYCAL PIPELINE PROPOSAL

State/County 1/ City	Temporary Housing									Permanent Housing
	Hotel/Motel Rooms			Rental Units			RV Spaces			
	Supply	Demand	%	Supply	Demand	%	Supply	Demand	%	
UTAH (continued)										
Utah				1,310			92	27	29	2,606
Orem	20	2	10	307	73	24	0	0	**	612
Provo	2,040	167	8	424	102	24	484	142	29	843
Wasatch				50			145	41	28	90
Heber City	200	134	67	19	87	448	155	43	28	35
Washington				185			334	64	19	475
St. George	2,000	133	7	82	87	106	107	20	19	211
Weber				1,236						1,926
Ogden	1,000	0	0	788	0	0	148	0	0	1,228
Box Elder				154						259
Brigham City	150	0	0	28	0	0	75	0	0	105
WYOMING										
Lincoln	74	53	72	133			8	13	163	167
Kemmerer	204	146	72	43	129	300	72	112	156	54
Uinta	96	11	11	139			0	0	**	163
Evanston	1,255	143	11	66	100	153	22	97	441	77
Sweetwater				388			195	0	0	538
Green River	165	0	0	100	0	0	55	0	0	138
Rock Springs	1,249	0	0	188	0	0	140	0	0	261

1/ Additional rooms and RV spaces in the county near the right of way.
** Infinite percentage resulting from division by zero.

Sources: Hotel/Motel supply derived from the Affected Environment Sections. Rental Units supply is calculated as those units for rent. Year Round supply is calculated as those units for rent or sale. Units listed as vacant awaiting occupancy or demolition, held for occassional use, or boarded up wetre not included. Due to a lack of data for rental unit or year round unit available housing supply for individual cities, the relationship between the numbers of these types of units and total housing units in the county and in which the city exists was used to adjust total vacant units in each individual city.

The aggregate socioeconomic impacts of the project presented in Table 4.2-13 provide information on the distribution of temporary housing demand by type of accommodation. As shown in Table 4.2-13, demand for various types of temporary housing will not be met in several areas. Impacts in Wyoming and Utah will be similar to those addressed in the FEIR/S, II/4.2.8.1. The demand for housing in Lincoln County, Nevada will most likely shift to the Las Vegas area. ~~One town in Nevada that is not shown is Laughlin, which is a rapidly growing casino center. It is most likely that any demands for housing in this area will be met across the Colorado River in the Bullhead City - Riviera, Arizona area. This area in Arizona currently supplies most of the public and private infrastructure needs of Laughlin.~~

4.2.8.2 Traffic

Refer to FEIR/S, II/4.2.8.2, II/4.5.1.8.2, I/4.2.8.2, and I/4.7.1.8.2 for construction methodology and potential impacts to traffic on transportation corridors for the Kern River, East Las Vegas, and Mojave pipeline routes.

Since access on the approximately 55 miles of the WyCal Mainline in Wyoming is obtainable from existing unimproved roads and ROWs, it is anticipated that no new access roads will be required. Any temporary roads planned would be confined to the ROW. Temporary roads constructed off the ROW on BLM lands must be reclaimed after use.

Transportation of equipment and supplies will create a temporary impact to traffic flow. Since construction workers will be transported to the construction areas by buses provided by the contractor, the impact of employee commuting will be reduced. Since the majority of the proposed pipeline is in rural areas, construction is not anticipated to greatly affect traffic flow. Any hard surfaced road or railroad track will be bored under from the shoulder. Traffic may be slowed by the construction activities but no real disruption is expected to occur.

Between NL 0 and 1 the proposed pipeline crosses U.S. Route 30N, approximately 1 mile west of the town of Opal, Wyoming. The pipeline runs adjacent to an existing pipeline corridor at this point. Near NL 54, the pipeline would cross I-80, a four-lane, main east-west artery in southern Wyoming.

4.2.8.3 Noise

A detailed discussion on construction related noise impacts have been presented in FEIR/S, I/4.2.8.3, I/4.7.1.8.3, and II/4.2.8.3. Construction activities would be temporary. As no sensitive noise receptors are located along the construction route, construction noise is not considered a significant impact.

Construction of the four proposed compressor stations would take about six months each. During this time noise levels would vary with the type of activity and the actual equipment being used. Only the Henderson Station could adversely affect noise levels. The noise reaching the nearby receptor would be attenuated by a distance of 470 meters (west of the site) and topography (elevated ridge in the intervening terrain).

The four proposed compressor stations would be the major source of noise emissions during the pipeline operation. Calculated noise levels associated with full load operation of the proposed compressor stations for the nearest noise sensitive areas would be less than 32 dBA for the Anschutz and Black Rock Stations. The calculated noise impact at the sensitive noise receptor at the Henderson Station would be 49 dBA attenuated by topography. The Topock Station noise impact would be less than 33 dBA.

The resultant sound levels at any nearby noise-sensitive receptors would be well below an L_{dn} of 55 dBA, the level identified by EPA as protecting the public from outdoor activity interference and annoyance. The WyCal compressor station noise levels therefore would not represent a significant impact.

4.2.8.4 Recreational Resources

Impacts to the existing dispersed recreational resources along the 55 miles of the WyCal Mainline in Wyoming are expected to be short-term. Refer to FEIR/S, II/4.2.8.4, II/4.5.1.8.4, I/4.2.8.4, and I/4.7.1.8.4 for a general discussion of impacts on dispersed recreation opportunities, and for information on those portions of the route which have been previously examined.

Given its remote setting, the majority of the proposed route area may be utilized for picnicking, camping, fishing, hunting, and other dispersed recreational activities. Noise, dust/dirt, and access restrictions to rural areas may create temporary disruptions for those who seek seclusion and to enjoy the wilderness.

Off-road vehicle activity on BLM land is heaviest during the fall hunting season. Pipeline construction during this time may interfere with access and hunting opportunities.

4.2.9 Land Ownership/Use

The reader is referred to FEIR/S, I/4.2.9, I/4.7.1.9, and II/4.2.9 for a discussion of how impacts are determined. Impacts are defined both in terms of significance and in terms of duration. Impacts which persist for a period exceeding one year are considered to be long term.

Table 4.2-14

CONSTRUCTION AND OPERATION DISTURBANCE BY LAND OWNERSHIP, WYCAL PIPELINE PROPOSAL

Pipeline Component	County, State	Disturbance Area	Total Acres	Private Acres	BLM Acres	State Acres	FS Acres	DOD Acres	NWR Acres
NORTHERN LEG									
WyCal/Kern River Proposal	Lincoln, WY	100' Construction 50' Operation	247.2 123.6	135.7 67.9	101.8 50.9	9.7 4.8	- -	- -	- -
	Uinta, WY	100' Construction 50' Operation	648.4 336.2 1/	496.9 248.5	121.2 60.6	30.3 27.1 1/	- -	- -	- -
	Summit, UT	100' Construction 50' Operation	441.2 220.6	441.2 220.6	- -	- -	-	- -	- -
	Wasatch, UT	100' Construction 50' Operation	305.4 152.7	192.7 96.3	- -	- -	112.7 56.4	- -	- -
	Utah, UT	100' Construction 50' Operation	466.6 233.3	231.5 115.7	- -	12.1 6.1	223.0 111.5	- -	- -
	Sanpete, UT	100' Construction 50' Operation	69.1 34.6	57.0 28.5	- -	12.1 6.1	- -	- -	- -
	Juab, UT	100' Construction 50' Operation	545.4 272.7	458.1 229.1	78.8 39.4	8.5 4.2	- -	- -	- -
	Millard, UT	100' Construction 50' Operation	781.7 402.9 1/	536.9 280.5 1/	216.9 108.5	27.9 13.9	- -	- -	- -
	Beaver, UT	100' Construction 50' Operation	409.7 204.8	71.5 35.7	318.8 159.4	19.4 9.7	- -	- -	- -
	Iron, UT	100' Construction 50' Operation	591.5 295.6	289.7 144.8	252.1 126.0	44.8 22.4	4.9 2.4	- -	- -
	Washington, UT	100' Construction 50' Operation	585.4 292.7	36.4 18.2	303.0 151.5	32.7 16.4	213.3 106.6	- -	- -
	Lincoln, NV	100' Construction 50' Operation	278.8 139.4	- -	278.8 139.4	- -	- -	- -	- -
	Clark, NV	100' Construction 50' Operation	766.0 395.0 1/	48.5 36.2 1/	717.5 358.8	- -	- -	- -	- -
East Las Vegas System Alternative	Clark, NV	100' Construction 50' Operation	792.7 396.3	65.5 32.7	727.2 363.6	- -	- -	- -	- -
	San Bernardino, CA	100' Construction 50' Operation	475.1 237.6	97.0 48.5	317.5 158.8	60.6 30.3	- -	- -	- -
Subtotal Northern Leg		100' Construction 50' Operation	7404.2 3738.0	3158.6 1603.2	3433.6 1716.9	258.1 141.0	553.9 276.9	- -	- -

Table 4.2-14 (continued)

CONSTRUCTION AND OPERATION DISTURBANCE BY LAND OWNERSHIP, WYCAL PIPELINE PROPOSAL

Pipeline Component	County, State	Disturbance Area	Total Acres	Private Acres	BLM Acres	State Acres	FS Acres	DOD Acres	NWR Acres
WESTERN LEG									
Mojave Transfer Line	Mohave, AZ	100' Construction	200.0	7.3	109.1	20.6	-	-	63.0
		50' Operation	100.0	3.6	54.5	10.3	-	-	31.5
Mojave Mainline	Mohave, AZ	100' Construction	12.1	-	-	-	-	-	12.1
		50' Operation	18.1 1/	12.0 1/	-	-	-	-	6.1
	San Bernardino, CA	100' Construction	2290.7	899.3	1373.2	6.1	-	-	12.1
		50' Operation	1145.3	449.7	686.6	3.0	-	-	6.1
	Kern, CA	100' Construction	1636.2	1338.1	132.1	2.4	-	163.6	-
		50' Operation	818.1	669.0	66.1	1.2	-	81.8	-
Kern Lateral	Kern, CA	100' Construction	545.4	545.4	-	-	-	-	-
		50' Operation	272.7	272.7	-	-	-	-	-
Subtotal Western Leg		100' Construction	4684.4	2790.1	1614.4	29.1	-	163.6	87.2
		50' Operation	2354.2	1407.0	807.2	14.5	-	81.8	43.7
TOTAL ROUTE		100' Construction	12,088.6	5,948.7	5,048.1	287.2	553.9	163.6	87.2
		50' Operation	6,092.2	3,010.2	2,524.1	155.5	276.9	81.8	43.7

1/ Includes compressor station acreage at 12 acres per station

BLM = Bureau of Land Management; DOD = Department of Defense; FS = Forest Service; NWR = National Wildlife Refuge

Table 4.2-15
CONSTRUCTION AND OPERATION DISTURBANCE BY LAND USE, WYCAL PIPELINE PROPOSAL

Pipeline Component	County, State	Disturbance Area	Total Acres	Grazing/ Rangeland Acres	Timber/ Forest Acres	Irrigated Non-Irrigated/ Agriculture Acres	Commercial/ Industrial Acres	Residential Acres	Other Acres
NORTHERN LEG									
WyCal/Kern River Proposal	Lincoln, WY	100' Construction	247.2	247.2	-	-	-	-	-
		50' Operation	123.6	123.6	-	-	-	-	-
	Uinta, WY	100' Construction	648.4	648.4	-	-	-	-	-
		50' Operation	336.2 1/	336.2 1/	-	-	-	-	-
	Summit, UT	100' Construction	441.2	404.8	-	36.4	-	-	-
		50' Operation	220.6	202.4	-	18.2	-	-	-
	Wasatch, UT	100' Construction	305.4	192.7	112.7	-	-	-	-
		50' Operation	152.7	96.3	56.4	-	-	-	-
	Utah, UT	100' Construction	466.6	231.5	235.1	-	-	-	-
		50' Operation	233.3	115.7	117.6	-	-	-	-
	Sanpete, UT	100' Construction	69.1	69.1	-	-	-	-	-
		50' Operation	34.6	34.6	-	-	-	-	-
	Juab, UT	100' Construction	545.4	369.7	-	175.7	-	-	-
		50' Operation	272.7	184.8	-	87.9	-	-	-
	Millard, UT	100' Construction	781.7	721.1	-	60.6	-	-	-
		50' Operation	402.9 1/	372.6 1/	-	30.3	-	-	-
	Beaver, UT	100' Construction	409.7	380.6	-	29.1	-	-	-
		50' Operation	204.8	190.3	-	14.5	-	-	-
	Iron, UT	100' Construction	591.5	591.5	-	-	-	-	-
		50' Operation	295.6	295.6	-	-	-	-	-
	Washington, UT	100' Construction	585.4	372.1	213.3	-	-	-	-
		50' Operation	292.7	186.0	106.7	-	-	-	-
	Lincoln, NV	100' Construction	278.8	278.8	-	-	-	-	-
		50' Operation	139.4	139.4	-	-	-	-	-
	Clark, NV	100' Construction	766.0	669.0	-	12.1	-	7.3	77.6
		50' Operation	395.0 1/	334.5	-	6.1	-	15.6 1/	38.8
East Las Vegas System Alternative	Clark, NV	100' Construction	792.7	729.6	-	-	-	63.1	-
		50' Operation	396.3	364.8	-	-	-	31.5	-
	San Bernardino, CA	100' Construction	475.1	475.1	-	-	-	-	-
		50' Operation	237.6	237.6	-	-	-	-	-
Subtotal Northern Leg			7404.2	6381.2	561.2	313.9	-	70.3	77.6
			3738.0	3214.6	280.6	156.9	-	47.1	38.8

Table 4.2-15 (continued)

CONSTRUCTION AND OPERATION DISTURBANCE BY LAND USE, WYCAL PIPELINE PROPOSAL

Pipeline Component	County, State	Disturbance Area	Total Acres	Grazing/ Rangeland Acres	Timber/ Forest Acres	Irrigated Non-Irrigated/ Agriculture Acres	Commercial/ Industrial Acres	Residential Acres	Other Acres
WESTERN LEG									
Mojave Transfer Line	Mohave, AZ	100' Construction	200.0	–	–	–	17.0	57.0	126.1
		50' Operation	100.0	–	–	–	8.5	28.5	63.0
Mojave Mainline	Mohave, AZ	100' Construction	12.1	–	–	–	–	–	12.1
		50' Operation	18.1 1/	–	–	–	–	–	18.10 1/
	San Bernardino, CA	100' Construction	2290.7	1963.4	–	303.0	24.2	–	–
		50' Operation	1145.3	981.7	–	151.5	12.1	–	–
	Kern, CA	100' Construction	1636.2	739.3	–	606.0	–	121.2	169.7
		50' Operation	818.1	369.7	–	303.0	–	60.6	84.8
Kern Lateral	Kern, CA	100' Construction	545.4	327.2	–	169.7	–	48.5	–
		50' Operation	272.7	163.6	–	84.8	–	24.3	–
Subtotal Western Leg		100' Construction	4684.4	3029.9	–	1078.7	41.2	226.7	307.9
		50' Operation	2354.2	1515.0	–	539.3	20.6	113.4	165.9
TOTAL ROUTE		100' Construction	12,088.6	9,411.1	561.2	1,392.6	41.2	297.0	385.5
		50' Operation	6,092.2	4,729.6	280.6	696.2	20.6	160.5	204.7

1/ Includes compressor station acres at 12 acres per station

The installation of a new pipeline typically is a long-term adverse environmental impact associated with public utilities. This includes widening existing utility corridors and developing new ones where existing corridors are absent. New corridors frequently require cutting paths through wooded areas which can affect the local aesthetics of an area. These impacts cannot be avoided unless existing rights-of-way and utility corridors are available for the entire route, and they are already wide enough to accommodate the new pipeline.

The presence of a permanent pipeline ROW would prohibit an owner from building any structures, such as buildings and swimming pools, and planting deep-rooted shrubs and trees on the ROW. Ornamental shrubs are typically allowed. If a landowner develops a piece of property in the future, the development plans would be required to take into account the existence of the permanent pipeline ROW. The presence of this ROW would render some parcels undevelopable and may make it more difficult to develop others.

An applicant would have to negotiate a ROW easement with each property owner along the route. If an easement cannot be negotiated with a landowner and the project has been certificated by the FERC, eminent domain proceedings, under federal law, could be used to obtain a ROW and establish compensation. This process varies from state-to-state but frequently involves the following process: appraisers would be appointed by the court to determine the amount due the landowners for the easement; the applicant would be required to deposit the amount determined by the appraisers with the court; and final payment would be made to the landowner by the court. This amount could be more, the same, or less than the amount of money offered during earlier negotiation. Applicants usually try to obtain a ROW without using eminent domain procedures. In addition, if a landowner feels the presence of the pipeline ROW adversely affects the value of their property, the landowner can appeal the assessment to their local government.

4.2.9.1 WyCal Mainline

No significant land use impacts are anticipated in connection with either the construction or operation of the proposed pipeline within Wyoming. Construction of the pipeline and associated facilities within portions of the Kemmerer Resource Area may be incompatible with policies established as part of the Resource Management Plan. ~~These~~ Although no such incompatibility has been identified, the Resource Management Plan concludes that public lands in this general area have been determined to be suitable for oil and gas leasing development subject to certain resource management protections that can be developed as required. Any incompatibilities can be resolved by minor changes to the Resource Management Plan.

Impacts for the proposed WyCal pipeline from MP 54 to 501 are the same as those discussed in the FEIR/S, II/4.2.9.1. Table 4.2-14 summarizes numbers of acres disturbed by the proposed project by land ownership category. Table 4.2-15 summarizes the number of acres disturbed by construction and operation of the proposed pipeline by land use category. As discussed in the FEIR/S, long term impacts occur where pipeline construction disrupts vineyards and orchards.

For the segment from MP 501 to the end of the Northern leg, impacts are the same as those discussed in FEIR/S, II/4.5.1.9 for the East Las Vegas Alternative. The primary significant impact for this segment is the potential conflict with residential uses in the City of Henderson, Nevada and the conflicts associated with crossing the Sunrise Mountain Natural Area.

Impacts for the western leg of the proposed pipeline are the same as those for the Mojave Pipeline addressed in FEIR/S, I/4.2.9.2 and I/4.2.9.3. Significant land use conflicts occur within BLM California Desert Conservation Area, Edwards Air Force Base, and the Stallion Springs community.

4.2.10 Cultural Resources

4.2.10.1 Archaeology

As described in Section 3.1.10.1, only newly proposed segments of the WyCal route are analyzed in detail in this document. New linear segments include two cultural sensitivity segments in Wyoming north of I-80, each 27.2 miles long; additional sensitivity assessment is required for new compressor and microwave station locations not otherwise analyzed as part of the proposals put forward by Kern River, Mojave and other groups.

Discussions of direct and indirect impacts definitions as well as impact significance are presented in FEIR/S, I/4.2.10, I/4.7.1.10, and II/4.2.10.

Twenty sites, one of which lies across a county line and was therefore recorded twice, are situated within the zone of direct impact of Sensitivity Segment 1. Potentially impacted sites include the Ziller Ranch, a historic mine, three historic trail segments, two sheep camps, a sheep camp with a lithic scatter, a lithic quarry, three probable prehistoric camp/lithic and hearth scatters, two tipi ring sites, and one site with no data. No sites are situated within the zone of direct impact in Segment 2.

Of these, only the quarry site has been determined not eligible, while one trail segment within the direct impact zone may be eligible and the Ziller Ranch is apparently in the process of nomination to the National Register. About 17.1% of the direct impact zone of Sensitivity Segment 1 and 25.4% of the direct impact zone of Sensitivity Segment 2 have been surveyed.

The zone of indirect impact for Segment 1 includes untabulated but continuing segments of the Oregon Trail, related to direct impact segments listed above, together with 15 cultural resource sites. These include a mine, a homestead, a historic camp, a town site with a prehistoric component, two historic trash scatters, and the southern end of the Cumberland National Historic District. Prehistoric sites included two campsites with hearths, two lithic scatters with burned rock, a lithic scatter, a burned rock scatter, and a quarry. Segment 2 contained no sites in the indirect impact zone.

As in the Kern River study, which WyCal's Wyoming route partially parallels, the first WyCal sensitivity segment is rated as having "very high" sensitivity while the second segment is rated as of "low" sensitivity (on the basis of site density alone) upgraded to "moderate" due to the presence of unassessed but probably National Register-eligible historic trail segments.

4.2.10.1.2 Compressor, Metering, and Microwave Stations

The study corridor of the Hams Fork metering and microwave station contains five sites. Of these, two lie within the zone of indirect impact, defined as station area as specified by WyCal, plus a 100 ft. circumferential buffer. Both also extend into the indirect impact zone, defined as the specified station area plus a 500 ft. circumferential buffer. The other three sites, two of which have National Register eligible prehistoric components lie in the study corridor but entirely outside the indirect impact zone.

Only the New York Mountains microwave station location is known to be near high site-density areas, but the exact station location relative to the sites is not known at this time.

4.2.10.2 American Indian Concerns

There is concern by various Indian groups regarding the passage of the WyCal mainline through the traditional ethnographic use areas discussed in FEIR/S, II/3.1.10.2. There are no known site specific impacts to American Indian heritage values in either the direct or indirect impact zone.

4.2.10.3 Total WyCal Mainline Cultural Impact Summary

Including segments originally proposed by Kern River and Mojave as well as new WyCal segments, the overall WyCal Mainline would contain eight very high or high sensitivity segments. Very high sensitivity segments include one in Wyoming and one in Utah; high sensitivity segments include two in Utah, one in Nevada, and three in California (see FEIR/S, I/II).

A total of 108 sites lie in the zone of direct impact; of these, six sites are either NRHP listed or officially determined eligible. Approximately 6% of the direct impact zone has been surveyed.

A total of 94 sites lie in the zone of indirect impacts. Of these, two have been determined non-eligible and six have been officially determined eligible or have been nominated to the National Register.

American Indian concerns have been summarized above and in the FEIR/S Cultural Resources Technical Report; the only impacted mainline locations of specific concern to Native Americans are the Topock Maze (see Mojave impacts, FEIR/S I/3.1.10.2), a religious location of central importance to the Fort Mojave and Chemehuevi groups, and the Chemehuevi trade trail (see Kern River impacts, FEIR/S, II/3.4.1.10.2).

4.2.11 Paleontological Resources

Refer to FEIR/S, I/4.2.11, I/4.7.1.11, and II/4.2.11 for criteria used to determine the significance of impacts that would occur to paleontological resources as a result of construction of the WyCal proposal.

The proposed mainline Northern Leg would traverse 358.6 miles of formations determined to be significant, 7.8 miles of formations with an undetermined significance, and 230.0 miles of formations determined not to be significant. Of this distance, 54.4 miles within Wyoming represent new or modified alignments which include 44.1 miles of formations determined to be sensitive and 10.3 miles of formations determined not sensitive.

A detailed breakdown of the geological formations, the fossils present, and the milepost locations of the formations have been discussed in the FEIR/S, Paleontological Resources Technical Report [Morales, et al. 1987]; formations encountered by the Wycal modifications are either treated in that report or else are clearly of low impact and sensitivity (e.g., preCambrian granite).

4.2.12 Visual Resources

Impacts are determined to be short-term or long-term depending on vegetation recovery rates, with over five years being long-term. The designated visual sensitivity for the entire proposed WyCal pipeline route is summarized in Table 4.2-16.

MP NL 0-1.0, VRM/VQO: BLM Class II Hams Fork Bottomland
This segment would create a moderate visual impact since the area has been previously disturbed by railroad and highway ROWs, as well as a pipeline pumping station at the beginning of the route.

Table 4.2-16

SUMMARY OF VISUAL IMPACTS, WYCAL PIPELINE PROPOSAL

Milepost	Jurisdiction	Affected Resource	VRM/VQO	Critical Viewpoint	Visual Impacts (Miles) High 1/	 Moderate 1/	 Low	Vac
NORTHERN LEG								
0.0-1.0	BLM	Hams Fork Bottomland	Class II	Highway 30N	–	1.0	–	–
1.0-50.0	BLM	Cumberland Flats	Class III, IV	Highway 189, jeep trails	–	–	50.0	–
50.0-54.4	BLM	Bear River Valley	Class IIIA	Interstate 15	–	4.4	–	–
58.4-63.4	BLM	Bear River Valley	Class II	Hwy. 150 & Evanston	–	5.0	–	–
122.9-123.3	FS	Uinta Natl. Forest	PR	Lake Creek Rd.	0.4	–	–	M
123.3-123.8	FS	Uinta Natl. Forest	R	Lake Creek Rd.	0.5	–	–	M&H
123.8-128.9	FS	Uinta Natl. Forest	PR	Strawberry River Rd.	5.1	–	–	L,M&H
132.6-133.5	FS	Uinta Natl. Forest	R	Highway 40	0.9	–	–	M
133.5-135.8	FS	Uinta Natl. Forest	PR	Highway 40	2.3	–	–	M
141.9-142.4	FS	Uinta Natl. Forest	PR	Hobble Creek Road	0.5	–	–	M,L, H
142.4-143.4	FS	Uinta Natl. Forest	R	Hobble Creek Road	0.9	–	–	M, L, H
143.4-143.5	FS	Uinta Natl. Forest	PR	Hobble Creek Road	0.1	–	–	M, H
143.9-144.0	FS	Uinta Natl. Forest	PR	Jeep trails	0.1	–	–	M
145.8-147.9	FS	Uinta Natl. Forest	R	5th Water Road	1.1	–	–	M, H
152.0-152.6	FS	Uinta Natl. Forest	PR	Diamond Fork Rd.	0.6	–	–	M&H
152.6-153.0	FS	Uinta Natl. Forest	R	Palmyra Cmpgrd./acc.rd.	0.4	–	–	M
153.0-154.7	FS	Uinta Natl. Forest	PR	Palmyra Cmpgrd./acc.rd.	1.7	–	–	L&M
155.6-156.0	FS	Uinta Natl. Forest	PR	Jeep Trails/Diamond Fk.	0.4	–	–	M
156.0-156.4	FS	Uinta Natl. Forest	R	Jeep Trails/Diamond Fk.	0.4	–	–	L&M
230.4-233.4	BLM	Scipio Pass	Class II	Interstate 15	–	3.0	–	–
270.4-280.4	BLM	Baker Canyon	Class IV	Seldom Seen	–	–	10.0	–
285.4-290.4	BLM	Pinnacle Pass	Class III	Black Rock Rd.	–	5.0	–	–
380.0-384.0	FS	Dixie Natl. Forest	PR	Hwy. 18 & Central	–	4.0	–	–
498.4-504.0	BLM	Rainbow Gardens	Class II	Hwy. 93, 95, and 147	5.6	–	–	–
507.0-508.0	BLM	Clark Co. Wetlands	N/A	Visitor Center, trails	1.4	–	–	–
			SUBTOTAL (Miles) OF VISUAL IMPACT		22.4	22.4	60.0	
WESTERN LEG								
Transfer Line								
8.0-11.5	FWS	Havasu NWR	III	Colorado River/Homes	–	–	3.5	–
16.0-16.5	FWS	Havasu NWR	III	I-40	–	–	0.5	–
Mainline								
0.0-1.5	FWS	Colorado River	NA	I-40	–	–	1.5	–
1.5-9.0	BLM	Chemehuevi Mts. WSA	IIA	Seldom Seen	–	7.5	–	–
9.0-12.2	BLM	Sacramento Mts.	IIBHFg 2/	Seldom Seen	–	3.2	–	–
20.5-24.5	BLM	Stepladder Mts. WSA	IIA	Seldom Seen	–	4.0	–	–
59.0-63.0	BLM	Marble Mts.	IIA	I-40	–	4.0	–	–
232.0	BLM/PRI	Pacific Crest Trail	NA		–	0.5	–	–
241.0-241.5	PRI	Tehachapi Mtn. Park	NA	The Park	–	0.5	–	–
			SUBTOTAL (Miles) OF VISUAL IMPACT		0	19.7	5.5	
			TOTAL ROUTE		22.4	42.1	65.5	

1/ Significant impacts
2/ HFg = high foreground

Low vegetation in this area would rejuvenate over a two to three year period. Therefore, this impact is considered to be a significant short-term impact which can be partly mitigated by a program to assist revegetation.

MP NL 1.0-50, VRM/VQO: BLM Class III and Class IV
This segment through the Cumberland Flats, Bear River Divide, and Whitney Canyon areas of the Kemmerer Resource Management area would create a low visual impact. There are extensive modifications throughout this area. Rejuvenation of sage and scrub vegetation ~~should occur over a two to three year period.~~ would result in a long-term recovery rate. Impacts in this area are not considered significant.

MP NL 50-54.4, VRM/VQO: BLM Class III(A)
The pipeline segment in this area, north of Interstate 80 and east of the town of Evanston is considered to create a moderate visual impact. Modifications in the area are limited to the I-80 ROW, which crosses the pipeline corridor. The area is visible to motorists travelling along I-80. Rejuvenation rates of sage and scrub vegetation ~~in the area are short-term.~~ would result in a long-term recovery rate. This impact is considered significant.

Impacts for the WyCal pipeline route from NL 54.4 to NL 501 are the same as those addressed in FEIR/S, II/4.2.12.2 for the Kern River Mainline mileposts 44 through 491. The reader is referred to FEIR/S, II/4.5.1.12 of the FEIS for a discussion of visual impacts for the segment from NL 501 to NL 605. Impacts for the Western Leg, Transfer Line, and El Paso's Base Case of the WyCal Pipeline route are the same as those discussed in FEIR/S, I/4.2.12.1, and 4.2.12.2, and 4.7.1.12 for the Mojave pipeline.

4.2.13 System Safety and Reliability

No new impacts associated with system safety and reliability were identified in the previously unanalyzed portions of the WyCal mainline. Impacts for the remainder of the Northern Leg (FEIR/S, II/4.2.13, II/4.5.13) and the Western Leg and Transfer Line (FEIR/S, I/4.2.13 and I/4.7.1.13) remain unchanged.

4.3 WYCAL ROUTE VARIATIONS

4.3.1 Wasatch Variation

Information on the Wasatch Variation Environmental Consequences is presented in FEIR/S, II/4.4.1. The impact information presented below on the alternatives would totally replace the impacts of the Wasatch Variation.

4.3.1.1 Air Quality

Air quality emissions and impacts would be essentially the same as under the proposed primary route which is presented in Section 4.2.1. Total overall construction emissions would be slightly higher due to an increase in length of the three alternatives.

4.3.1.2 Geology

4.3.1.2.1 Bountiful Boulevard Alternative

The geologic impacts associated with the Bountiful Boulevard Alternative would be minimal. This alternative does cross the lower portion of at least three drainages which have had slope stability problems in the past. No signs of slope instability were observed along the alternative route during the May 1988, aerial reconnaissance, although slope instability was observed in the mile-wide study area. However, it is conceivable that a debris flow of sufficiently large magnitude to negatively impact the pipeline could develop in the upper portions of the watershed. See Table 4.3-1 for significant geologic hazards along the Wasatch Variation Alternatives. The Warm Springs segment of the Wasatch Fault would be crossed on this alternative.

Detailed impacts associated with geologic hazards along the Wasatch Variation are provided in FEIR/S, II/4.4.1.2. These hazards are applicable to those areas defined in FEIR/S, II/Table 4.4-1 as outlined in the Wasatch Variation of Kern River.

4.3.1.2.2 Pages Lane Alternative

The geologic impacts associated with the Pages Lane Alternative are similar to those described for the Bountiful Boulevard Alternative (Section 4.3.1.2.1). A pipeline does exist along this proposed route. No evidence of slope instability along the alternative route was noted during a May, 1988, aerial reconnaissance, although slope instability was observed in the mile-wide study area. The Wasatch Fault would be crossed by the alternative.

Table 4.3-1

SIGNIFICANT GEOLOGICAL HAZARDS, WASATCH VARIATION ALTERNATIVES

Mile-post	Location	Liquefaction/ Ground Failure	Surface Fault Rupture	Slope Instability	Ground Subsidence	Flash Flooding	Avalanche
Bountiful Boulevard Alternative							
15-42	Coalville to Bountiful	X	-	X	-	-	-
15-48	Wasatch Mtns	-	X	X	-	-	X
48	North Salt Lake	-	-	-	-	-	-
48-75	Bountiful to South Jordan	X	X	-	-	-	-
76-NL 214	South Jordan to Millis	X	-	-	-	-	-
Pages Lane Alternative							
15-44	Coalville to Bountiful	X	-	X	-	-	-
26-45	Wasatch Mtns	-	X	X	-	-	X
44	Bountiful	-	-	-	-	-	-
44-76	Bountiful to South Jordan	X	X	-	-	-	-
77-NL 214	South Jordan to Millis	X	-	-	-	-	-
Bountiful Peak Alternative							
15-47	Coalville to Bountiful	X	-	X	-	-	-
26-47	Wasatch Mtns	-	X	X	-	-	X
47	Farmington	-	-	-	-	-	-
47-81	Bountiful to South Jordan	X	X	-	-	-	-
82-NL 214	South Jordan to Millis	X	-	-	-	-	-

Detailed impacts associated with geologic hazards along the Wasatch Variation are provided in FEIR/S, II/4.4.1.2.. These hazards are applicable to those areas defined in FEIR/S, II/Table 4.4-1 as outlined in the Wasatch Variation of Kern River.

4.3.1.2.3 Bountiful Peak Alternative

The geologic impacts associated with the Bountiful Peak Alternative are similar to those described for the Bountiful Boulevard Alternative (Section 4.3.1.2.1).

Skyline Drive Road traverses 0.4 of a mile of 65 percent slopes. Widening this road to accommodate pipeline construction would create cutslopes over 150 feet high, resulting in 7 acres of soil disturbance on very steep slopes with low reclamation potential. There would be 10 foot plus cutbanks on the remaining 2.6 miles of the Skyline Drive traversed by the pipeline, increasing the acres of soil disturbance with low reclamation potential.

No areas of recent slope instability were observed during an aerial reconnaissance in May 1988, although slope instability was observed in the mile-wide study area. Because of the steep nature of the ridge, the potential does exist for construction activities to alter subsurface flows to the extent that slope stability problems could be created. The Wasatch Fault would be crossed by this alternative.

Detailed impacts associated with geologic hazards along the Wasatch Variation are provided in FEIR/S, II/4.4.1.2. These hazards are applicable to those areas defined in FEIR/S, II/Table 4.4-1 as outlined in the Wasatch Variation of Kern River.

4.3.1.3 Soil

See FEIR/S, II/4.2.3 for information on soil impacts. The distribution of potential impacts for all three alternatives is presented in Table 4.3-2.

4.3.1.4 Surface Water

4.3.1.4.1 Bountiful Boulevard Alternative

Comments made regarding surface water impacts from pipeline construction and hydrostatic testing in FEIR/S, I/4.2.4 and II/4.2.4 and II/4.4.1.4 also apply to this alternative.

Within the Middle Rocky Mountains region, approximately 13 perennial, 18 intermittent, and numerous ephemeral drainage channels would be crossed. The perennial streams that would be crossed include Holbrook Canyon and Mill Creeks. ~~These streams are~~ Holbrook Canyon is a proposed municipal watershed with high

Table 4.3-2

DISTRIBUTION OF POTENTIAL SOILS IMPACTS, WASATCH VARIATION ALTERNATIVES

		Erosion Potential 1/						Reclamation Potential 2/		
		Water (miles) 3/			Wind (miles) 3/			(miles) 3/		
Milepost	Geographic Area	L	M	H	L	M	H	G	F	P
Wasatch Variation - Bountiful Boulevard										
0.0-48.5	Middle Rocky Mountains	4.0	13.0	31.5	47.0	1.5	0.0	2.0	20.0	26.5
48.5-154	Basin and Range	88.0	15.5	2.0	69.5	36.0	0.0	54.5	21.0	30.0
Wasatch Variation - Pages Lane										
0.0-43.5	Middle Rocky Mountains	4.0	10.8	28.7	42.0	1.5	0.0	2.0	17.8	23.7
43.5-155	Basin and Range	94.0	15.5	2.0	73.0	38.5	0.0	56.5	22.5	32.5
Wasatch Variation - Bountiful Peak										
0.0-47.5	Middle Rocky Mountains	4.0	10.8	32.7	46.0	1.5	0.0	2.0	17.8	27.7
47.5-159.6	Basin and Range	94.7	15.4	2.0	72.3	39.8	0.0	57.0	22.8	32.3

1/ Water Erosion Potential
L(low) = less than 5 tons/acre/year (low probability for significant erosion impacts).
M(moderate) = 5 to 20 tons/acre/year (near even probability for significant erosion impacts).
H(high) = greater than 20 tons/acre/year (high probability for significant erosion impacts).
Wind Erosion Potential
L(low) = low probability for significant erosion impact.
M(moderate) = near even probability for significant erosion impacts. Impact potential also dependent upon site specific exposure to prevailing winds.
H(high) = high probability for significant erosion impacts. Impact potential also dependent upon site specific exposure to prevailing winds.

2/ Reclamation Potential
(Ratings are based upon trenching with no selective soil handling or other mitigation.)
G(good) = good probability for restoring vegetation which will support pre-existing land use. Productivity potential may be somewhat reduced.
F(fair) = near even probability for restoring vegetation which will support pre-existing land use within short periods of time. Time needed for reestablishment is likely to be longer than soils with good potential. Productivity potential may be reduced.
P(poor) = low probability for restoring vegetation which will support pre-existing land use within a short period of time. Time needed for reestablishment is likely to be long. Productivity potential may be reduced.

3/ Cumulative miles for pipeline segment.

sensitivities to pipeline construction as itemized in Table 3.2-2 and a high chance of significant impacts resulting from the construction activity unless precautions are applied. Between the Ward Canyon corridor and the point where this alternative rejoins the Wasatch Variation there would be no impact on perennial or intermittent streams. All such drainages are channeled beneath Bountiful Boulevard and would not be disturbed. ~~See FEIR/S, II/4.4.1.4.1 for more discussion on impacts that could occur due to crossing Holbrook Canyon and Mill Creek.~~

Within the Basin and Range region, approximately 3 perennial, 16 intermittent, and numerous ephemeral drainage channels would be crossed. The perennial streams that would be crossed include the Jordan River, Bingham Creek, and the Sevier River. These streams have low to moderate sensitivities to pipeline construction indicating that significant impacts resulting from pipeline construction would be unlikely.

4.3.1.4.2 Pages Lane Alternative

Comments made regarding surface water impacts from pipeline construction and hydrostatic testing in FEIR/S, I/4.2.4 and II/4.2.4 and II/4.4.1.4 also apply to this alternative.

Within the Middle Rocky Mountains region, approximately 12 perennial, 13 intermittent, and numerous ephemeral drainage channels would be crossed. The perennial streams that would be crossed primarily have moderate to high sensitivities to pipeline construction as itemized in Table 3.2-2 and there is a moderate to high chance of significant impacts resulting from the construction activity unless precautions are applied. Holbrook Canyon, a municipal watershed, would be paralleled.

Within the Basin and Range region, approximately 3 perennial, 15 intermittent, and numerous ephemeral drainage channels would be crossed. The perennial streams that would be crossed include the Jordan River, Bingham Creek, and the Sevier River. These streams have low to moderate sensitivities to pipeline construction indicating that significant impacts resulting from pipeline construction would be unlikely.

4.3.1.4.3 Bountiful Peak Alternative

Comments made regarding surface water impacts from pipeline construction and hydrostatic testing in FEIR/S, I/4.2.4 and II/4.2.4 and II/4.4.1.4 also apply to the WyCal proposal.

Within the Middle Rocky Mountains region, approximately 11 perennial, 12 intermittent, and numerous ephemeral drainage channels would be crossed. The perennial streams that would be crossed primarily have moderate to high sensitivities to pipeline construction as itemized in Table 3.2-2. This indicates that there is a moderate to high chance of significant impacts resulting from the construction activity unless precautions are applied. This alternative would cross the extreme upper reaches of several canyons important as municipal watersheds.

Within the Basin and Range region, approximately 3 perennial, 16 intermittent, and numerous ephemeral drainage channels would be crossed. The perennial streams that would be crossed include the Jordan River, Bingham Creek, and the Sevier River. These streams have low to moderate sensitivities to pipeline construction indicating that significant impacts resulting from pipeline construction would be unlikely.

4.3.1.5 Groundwater

Potential impacts to groundwater along all of the alternatives of the Wasatch Variation are low due to the moderate to great depth to water, the high background salinity, or the low use of groundwater in the area. See FEIR/S, II/4.2.5.

4.3.1.6 Freshwater Biology

4.3.1.6.1 Bountiful Boulevard Alternative

General impacts discussed in FEIR/S, II/4.4.1.6 would also apply to this alternative. Of the 15 streams with fisheries resources that would be crossed by this alternative, 8 streams, all within the Middle Rocky Mountains region, could be significantly impacted by construction activities. The potential for significant impacts is due primarily to the presence of high quality aquatic resources and the sensitivity level of those watershed to disturbance. As previously referenced, there would be no impact to streams crossed by the pipeline while in the Bountiful Boulevard ROW.

4.3.1.6.2 Pages Lane Alternative

General impacts discussed in FEIR/S, II/4.4.1.6 would also apply to this alternative. Of the 14 streams that would be crossed by this alternative, ~~seven~~ six streams, all within the Middle Rocky Mountains region, could be significantly impacted by construction activities.

4.3.1.6.3 Bountiful Peak Alternative

General impacts discussed FEIR/S, II/4.4.1.6 would also apply to this variation. Of the 13 streams that would be crossed by this alternative, six streams, all within the Middle Rocky Mountains region, could be significantly impacted by construction activities.

4.3.1.7 Terrestrial Biology

4.3.1.7.1 Vegetation

Bountiful Boulevard Alternative (BB 0-154)

For the portion of the route not previously covered in the FEIR/S (BB 39.6-46.4), approximately 2.1 acres of wetland/riparian vegetation would be disturbed (Class II). Class III impacts to approximately 79.1 acres of mountain brush would occur through denudation by construction of this alternative. No Class I impacts would occur. No plant species of concern occur along this proposed alternative.

Total disturbance along the Bountiful Boulevard Alternative would involve Class II impacts to 72.7 acres of urban land, 123.6 acres of wetland/riparian, 20.6 acres of montane forest, and 425.5 acres of agricultural land. Nonsignificant impacts (Class III) would occur to 48.5 acres of Utah grassland, 254.5 acres of pinyon-juniper woodland, 286.1 acres of mountain brush, and 635.2 acres of sagebrush scrub. Pipeline construction along this route would not disturb any plant species of special concern.

Pages Lane Alternative (PL 0-155)

Approximately 166.1 acres of vegetation would be denuded by construction of the portion of this route not previously covered in the Kern River Wasatch Variation (PL 39.6-53.4). Impacts to approximately 36.4 acres of wetland/riparian, 26.7 acres of urban land, and 59.4 acres of agricultural land would generate a total of 122.5 acres of significant (Class II) impacts. Additionally, 43.6 acres of mountain brush would be impacted, but this would not be considered significant (Class III). No plant species of special concern would be impacted by this alternative.

Total disturbance for this alternative would involve 99.4 acres of urban land, 115.2 acres of wetland/riparian, 20.6 acres of montane forest, and 483.6 acres of agricultural land (Class II impacts). Class III impacts would occur on 249.7 acres of mountain brush, 254.5 acres of pinyon-juniper woodland, 607.3 acres of sagebrush scrub, and 48.5 acres of Utah grassland.

Bountiful Peak Alternative (BP 0-159.6)

For the portion of the alternative not covered in the FEIR/S (BP 38.5-58.4), approximately 241.2 acres of vegetation would be denuded. Approximately 141.8 acres of Class II impacts would occur, including 36.3 acres of wetland/riparian, 8.5 acres of montane forest, and 97.0 acres of agricultural land. Class III impacts would occur to 99.4 acres of mountain brush. No plant species of special concern are known to occur along the pipeline route or in the general vicinity of the route.

Table 4.3-3

VEGETATION TYPES AND DENUDED ACREAGES, WASATCH VARIATION ALTERNATIVES

			Denudation [1] (Acres)			
Geographic Region	Vegetation Type	Impact[2] Class	Short Term[3]	Long Term[4]	Permanent[5]	Total
		BOUNTIFUL BOULEVARD ALTERNATIVE				
Middle Rocky Mountain (Wasatch Mountains)	Sagebrush scrub	III	206.1	0	0	206.1
	Pinyon-Juniper woodland	III	6.0	6.1	0	12.1
	Montane forest	II	10.3	10.3	0	20.6
	Agricultural land	II	36.4	0	0	36.4
	Wetland/riparian	II	2.4	0	0	2.4
	Mountain brush	III	143.0	143.1	0	286.1
		Subtotal	404.2	159.5	0	563.7
Basin and Range	Agricultural land	II	389.1	0	0	389.1
	Sagebrush scrub	III	429.1	0	0	429.1
	Utah grassland	III	48.5	0	0	48.5
	Urban	II	72.7	0	0	72.7
	Pinyon-Juniper woodland	III	121.2	121.2	0	242.4
	Wetland/riparian	II	121.2	0	0	121.2
		Subtotal	1181.8	121.2	0	1303.0
Summary by Vegetation Type						
	Sagebrush scrub	III	635.2	0	0	635.2
	Pinyon-juniper woodland	III	127.2	127.3	0	254.5
	Wetland/riparian	II	123.6	0	0	123.6
	Montane forest	II	10.3	10.3	0	20.6
	Agricultural land	II	425.5	0	0	425.5
	Urban	II	72.7	0	0	72.7
	Mountain brush	III	143.0	143.1	0	286.1
	Utah grassland	III	48.5	0	0	48.5
		TOTAL	1586.0	280.7	0	1866.7
Summary by Impact Class						
	Class	I	0	0	0	0
	Class	II	632.1	10.3	0	642.4
	Class	III	953.9	270.4	0	1224.3
	Class	IV	0	0	0	0
		TOTAL	1586.0	280.7	0	1866.7
		PAGES LANE ALTERNATIVE				
Middle Rocky Mountain (Wasatch Mountains)	Sagebrush scrub	III	206.1	0	0	206.1
	Pinyon-Juniper woodland	III	6.0	6.1	0	12.1
	Montane forest	II	10.3	10.3	0	20.6
	Agricultural land	II	36.4	0	0	36.4
	Mountain brush	III	124.8	124.9	0	249.7
		Subtotal	383.6	141.3	0	524.9

Table 4.3-3 (continued)

VEGETATION TYPES AND DENUDED ACREAGES, WASATCH VARIATION ALTERNATIVES

Geographic Region	Vegetation Type	Impact Class [2]	Denudation [1] (Acres)			
			Short Term[3]	Long Term[4]	Permanent[5]	Total
Basin and Range	Agricultural land	II	447.2	0	0	447.2
	Sagebrush scrub	III	401.2	0	0	401.2
	Utah grassland	III	48.5	0	0	48.5
	Urban	II	99.4	0	0	99.4
	Pinyon-Juniper woodland	III	121.2	121.2	0	242.4
	Wetland/riparian	II	115.2	0	0	115.2
		Subtotal	1232.7	121.2	0	1353.9
Summary by Vegetation Type						
	Sagebrush scrub	III	607.3	0	0	607.3
	Pinyon-juniper woodland	III	127.2	127.3	0	254.5
	Wetland/riparian	II	115.2	0	0	115.2
	Montane forest	II	10.3	10.3	0	20.6
	Agricultural land	II	483.6	0	0	483.6
	Urban	II	99.4	0	0	99.4
	Mountain brush	III	124.8	124.9	0	249.7
	Utah grassland	III	48.5	0	0	48.5
		TOTAL	1616.3	262.5	0	1878.8
Summary by Impact Class						
	Class	I	0	0	0	0
	Class	II	708.5	10.3	0	718.8
	Class	III	907.8	252.2	0	1160.0
	Class	IV	0	0	0	0
		TOTAL	1616.3	262.5	0	1878.8
BOUNTIFUL PEAK ALTERNATIVE						
Middle Rocky Mountain (Wasatch Mountains)	Sagebrush scrub	III	206.1	0	0	206.1
	Pinyon-Juniper woodland	III	6.0	6.1	0	12.1
	Montane forest	II	7.2	7.3	0	14.5
	Agricultural land	II	36.4	0	0	36.4
	Mountain brush	III	152.7	152.8	0	305.5
		Subtotal	408.4	166.2	0	574.6
Basin and Range	Agricultural land	II	483.6	0	0	483.6
	Sagebrush scrub	III	397.5	0	0	397.5
	Utah grassland	III	48.5	0	0	48.5
	Urban	II	72.7	0	0	72.7
	Pinyon-Juniper woodland	III	121.2	121.2	0	242.4
	Wetland/riparian	II	115.2	0	0	115.2
		Subtotal	1238.7	121.2	0	1359.9

Table 4.3-3 (continued)

VEGETATION TYPES AND DENUDED ACREAGES, WASATCH VARIATION ALTERNATIVES

Geographic Region	Vegetation Type	Impact Class 2/	Denudation 1/ (Acres) Short Term 3/	Long Term 4/	Permanent 5/	Total
Summary by Vegetation Type						
	Sagebrush scrub	III	603.6	0	0	603.6
	Pinyon-juniper woodland	III	127.2	127.3	0	254.5
	Wetland/riparian	II	115.2	0	0	115.2
	Montane forest	II	7.2	7.3	0	14.5
	Agricultural land	II	520.0	0	0	520.0
	Urban	II	72.7	0	0	72.7
	Mountain brush	III	152.7	152.8	0	305.5
	Utah grassland	III	48.5	0	0	48.5
		TOTAL	1647.1	287.4	0	1934.5
Summary by Impact Class						
	Class	I	0	0	0	0
	Class	II	715.1	7.3	0	722.4
	Class	III	932.0	280.1	0	1212.1
	Class	IV	0	0	0	0
		TOTAL	1647.1	287.4	0	1934.5

1/ vegetation loss assuming a 100-foot wide construction ROW and a 50-foot wide operational ROW.

2/ see section 4.2.7.1 of the Kern document for definitions of impact class

3/ short-term loss = vegetation loss within community types with fair or better revegetation potential; vegetation loss within total 100-foot wide construction ROW if large woody shrubs or trees not present; vegetation loss short term within the 50-foot wide portion of the construction ROW not used for operation with large woody shrubs and trees present; vegetation loss would not be significant.

4/ long-term loss = loss of vegetation within community types with fair or better revegetation potential containing large woody shrubs or trees present in operational ROW (50-foot wide) which would hamper operations and, therefore, would not be allowed to reestablish in the operational ROW during the life of the project; loss would not be significant.

5/ permanent loss = loss of vegetation within community types with poor or worse revegetation potential; vegetation loss would be significant.

Disturbance for the entire length of this alternative would involve Class II impacts to 115.2 acres of wetland/riparian, 520.0 acres of agricultural lands, 14.5 acres of montane forest, and 72.7 acres of urban land, as well as Class III impacts to 305.5 acres of mountain brush, 603.6 acres of sagebrush scrub, 254.5 acres of pinyon-juniper woodland, and 48.5 acres of Utah grassland. No plant species of special concern would be impacted.

See Table 4.3-3 for vegetation types and denuded acreages for the Wasatch Variation Alternatives.

4.3.1.7.2 Wildlife

Bountiful Boulevard Alternative

Criteria used to determine significance of impacts associated with construction of the proposed Bountiful Boulevard alternative are the same as presented in FEIR/S, II/4.2.7.2. Classification of impacts is described in Section 4.2.7.2 of this Supplement. Significant impacts to general wildlife are presented in Table 4.3-4.

General Wildlife. FEIR/S, II/4.4.7.2 provides an explanatory narrative of general wildlife impacts, and are applicable to this alternative. A quantification of impacts are as follows.

Class II
- ~~46.7~~ 45.9 miles of potential disturbance to wintering big game.
- Disturbance of 48 acres of critical elk winter range along four miles of the proposed route.
- 0.5 mile of potential sage grouse nesting habitat disturbed.
- Seven raptor nests potentially disturbed.
- Disturbance of 28 acres of crucial waterfowl nesting and brooding habitat.

Class III
- Disturbance of approximately ~~215~~ 364 acres of big game winter range.
- Waterfowl nest destruction.

Wildlife Species of Special Concern. FEIR/S, II/4.4.7.2 provides an explanatory narrative of individual wildlife impacts, and are applicable to this alternative. A quantification of impacts are as follows.

Table 4.3-4

SIGNIFICANT WILDLIFE IMPACTS, WASATCH VARIATION ALTERNATIVES 1/

Wildlife groups and life requisites impacted 2/

Milepost	Wintering 3/ big game	Nesting/breeding sage grouse	Nesting/brooding waterfowl	Nesting raptors
0-20	E,M,MD	-	-	-
21-40	MD	x 4/	-	-
41-60	MD	-	-	-
61-80	-	-	-	-
81-100	-	-	-	1 nest
101-120	-	-	-	6 nests
121-140	MD	-	-	-
141-154 (end)	MD	-	x 4/	-

1/ Location of wildlife impacts occur within the same 20-mile segmnet for each of the three Wasatch Variations.

2/ Impacts are delineated by species, where possible, and include both habitat and population related impacts unless specifically stated in the table.

3/ Big game species include mule deer (MD), elk (E), and moose (M).

4/ An "X" signifies that an impact occurs within the milepost designation

Class II
- ~~Four~~ 5.5 miles of potential disturbance to wintering bald eagles.
- Disturbance of potentially nesting peregrine falcons at hack site southwest of Bountiful.
- Disturbance of the hack site when fledglings are present.
- Two ferruginous hawk nests potentially disturbed.
- Disturbance of a bald eagle winter roost site.

Class III
- Disturbance of approximately 120 acres of habitat within peregrine falcon hunting territory. The proposed alternative would traverse approximately 20 miles of pastureland that provide hunting habitat for peregrines. One small riparian zone (0.3 mile) along the Jordan River would also be crossed. Since more suitable large expanses of hunting habitat (e.g. marshlands and riparian zones associated with the Great Salt Lake) exist within the immediate area, habitat disturbance is not anticipated to significantly affect prey availability or hunting behavior within the area of concern.

Pages Lane Alternative

Criteria used to determine significance of impacts associated with construction of the proposed Pages Lane alternative are the same as presented in FEIR/S, II/4.2.7.2. Classification of impacts is described in Section 4.2.7.2 of this Supplement. Significant impacts to general wildlife are presented in Table 4.3-4.

General Wildlife. General wildlife impacts are the same as described for the Bountiful Boulevard Alternative presented above.

Wildlife Species of Special Concern. Impacts to species of special concern are basically the same as those described above for Bountiful Boulevard. ~~Four miles of~~ Potential disturbance to 5.5 miles of wintering bald eagles (Class II impact) would occur along this proposed variation, as would disturbance of a bald eagle winter roost site.

Bountiful Peak Alternative

Criteria used to determine significance of impacts associated with construction of the proposed Bountiful Peak Alternative are the same as presented in FEIR/S, II/4.2.7.2. Classification of impacts is described in Section 4.2.7.2 of this Supplement. Significant impacts to general wildlife are presented in Table 4.3-4.

General Wildlife. General wildlife impacts are the same as described for the Bountiful Boulevard Alternative presented above; except ~~45.3~~ 44.5 miles of this proposed route could disturb wintering mule deer (Class II impact) as opposed to the 46.7 miles which may be disturbed by the other two alternatives.

Wildlife Species of Special Concern. Impacts to species of special concern are basically the same as those described above for Bountiful Boulevard. However, ~~12.2~~ 13.7 miles of potential disturbance to wintering bald eagles (Class II impact) would occur along this proposed variation; a bald eagle winter roost; and approximately 225 acres of peregrine hunting habitat would be disturbed (Class III impact).

4.3.1.7.3 Grazing

Criteria used to evaluate potential grazing impacts are the same as described in FEIR/S, II/4.2.7.3. No significant impacts to grazing for all three alternatives is anticipated due to project implementation.

4.3.1.8 Socioeconomics

4.3.1.8.1 Population, Housing, and Economic Impacts

The Wasatch Variations will not measurably change the estimated socioeconomic impacts of this project as presented in Section 4.2.8.1. The impacts of this variation may be slightly greater as a result of the small increases in length of the overall pipeline.

4.3.1.8.2 Traffic

Those areas of the Wasatch Variation Alternatives on the Wasatch-Cache National Forest which have no access from major highways, or which access by Forest roads to the route of the variation would be adversely impacted. Refer to FEIR/S, II/4.4.1.8.2 for a discussion of impacts to Forest Service roads. General impacts to Forest Service land would be a temporary compromise of the recreational opportunity spectrum objectives as far as providing the experience of tranquility and isolation desired by those who drive Forest roads.

Bountiful Boulevard Alternative

The proposed route would traverse Ward Canyon and a portion of Holbrook Canyon and access would be limited. The major significant impact would be where construction is planned to occur on Bountiful Boulevard. The Bountiful Boulevard Alternative does not cross many residential streets. It does cross the road to Mueller Park and North Canyon Road which may cause some delays. Construction within Bountiful Boulevard and at intersections would cause significant delays or detours to traffic.

Pages Lane Alternative

The Pages Lane Alternative would create a significant adverse impact on 4000 South/1800 North Street where construction is planned to occur. Traffic detours and construction activity could significantly disrupt traffic on over 25 residential and city streets as well as I-15 and other heavily traveled roads.

Bountiful Peak Alternative

The major impact of this route would occur on Skyline Drive on Forest Service land which is designated as Roaded Natural Appearing, and intended to provide moderate isolation from sights and sounds of humans. Pipeline construction would cause a temporary significant adverse impact. Delays caused by transportation of heavy equipment and construction would create a temporary adverse impact to urban traffic in West Bountiful and Centerville, to I-15 and other Federal and state roads.

4.3.1.8.3 Noise

Pipeline construction along the route variation would cause the same types of impacts as those discussed in FEIR/S, II/4.2.8.3 and II/4.4.1.8.3. This variation and the variation alternatives (see Section 2.3.1.1) would contain a significant number of noise receptors within 250 feet of the construction ROW and thus noise levels could potentially exceed 65 dBA. Increased noise levels would be short-term, lasting 10 working days or less at any particular point along the roue. Temporary noise increases would be of greatest impact where construction occurs in or adjacent to residential areas and schools, in Bountiful City for both the Bountiful Boulevard and Pages Lane Alternatives. In addition to these areas portions of the alternatives in West Valley City would also be affected. However, due to the temporary nature of the construction, noise will not be considered to be a significant impact.

Construction of any one of the Wasatch Variations would still require four compressor stations. Neither the location nor the horsepower of the proposed compressor stations would be changed. The impacts during construction and operation were previously discussed in Section 4.2.8.3 of this volume.

4.3.1.8.4 Recreational Resources

For a general discussion of impacts on dispersed recreational resources and Forest Service recreational opportunity spectrum (ROS) objectives, refer to FEIR/S, II/4.2.8.4. A short-term significant impact would occur on the dispersed recreational opportunities on Forest Service land due to increased noise, dirt/dust, and disturbance. Influx of construction workers and heavy machinery and equipment will add to this impact.

No recreational impact is expected to occur on the private lands the route traverses since ~~no~~ few recreational facilities exist and the dispersed recreational opportunities, given the urban nature, are few. Several city parks and golf courses lie within the analysis corridors of the Bountiful Boulevard, Pages Lane, and Bountiful Peak Alternatives. Impacts in the form of dust and noise would occur during construction.

Bountiful Boulevard Alternative

The proposed alternative crosses approximately 1.0 miles of Wasatch-Cache National Forest land. The ROS objectives for the Semiprimitive Nonmotorized and motorized areas would be compromised and constitute a significant impact on the dispersed recreational opportunities present there.

Pages Lane Alternative

The proposed alternative crosses 1.8 miles of Forest Service land, designated as Semiprimitive Nonmotorized (1.0 mile) and Roaded Natural (.8 mile) and would have similar impacts to those discussed for Bountiful Boulevard.

Bountiful Peak Alternative

The proposed route crosses ~~four~~ 4.3 miles of Forest Service Semiprimitive Nonmotorized land and ~~3.5~~ 4.1 miles of Roaded Natural Appearing. Along the Roaded Natural Appearing land, the route parallels Skyline Drive which is heavily traveled by Forest visitors. A ~~short~~ long-term significant adverse impact to the natural visual scene would occur during construction and ROW revegetation.

Since construction crews will attempt to avoid public campgrounds, the Bountiful Peak campground should not be impacted. Although construction may cause temporary impacts to the southern access route for the campground.

The route enters a Helicopter Skiing area for two miles and parallels it for another 1.5 miles. This should not present an impact since this area is available only for winter use.

4.3.1.9 Land Ownership/Use

Table 4.3-5 shows the number of acres that would be disturbed by construction and operation, for each of the alternatives to the Wasatch Variation by land ownership. Table 4.3-6 summarizes the number of acres disturbed by the construction and operation of the alternatives by land use.

For the portion of both the Bountiful Boulevard and the Pages Lane alternatives which follows the MFR pipeline, no significant or long term impacts have been identified. Within the National Forest, these alternatives follow the Ward Canyon utility corridor, so no conflicts exist with the Forest Plan.

Bountiful Boulevard Alternative

Since there is no existing utility corridor along Bountiful Boulevard, which serves a present and future residential area, potential land use impacts are considered to be significant. Both short- and long-term impacts could affect residences adjacent to Bountiful Boulevard. During construction, utility services may be curtailed due to conflicts and/or relocation of certain existing utility lines to accommodate the proposed gas pipeline. Subsequent maintenance activities on either the proposed pipeline or an existing utility line could result in chronic service interruptions for the life of the project.

Pages Lane Alternative

Potential land use impacts are considered to be ~~potentially~~ significant. Although there are currently sewer and water pipes below the street as well as other residential service utilities within the ROW, this is not a designated utility corridor. Further, land uses adjacent to the ROW include over 120 residences and a major commercial center. Impacts to residential uses would be both short- and long-term, as described for the Bountiful Boulevard Alternative discussed above.

No land use impacts are associated with the portion of this alternative which follows the UP&L transmission corridor.

Potential land use impacts associated with Porter Lane would be similar to those described for Pages Land and are considered to be significant.

Bountiful Peak Alternative

This alternative will result in significant land use impacts within the Wasatch-Cache National Forest. Since this route does not follow any existing utility corridor, a modification to the Forest Plan will be required. Conflicts with the visual quality

Table 4.3-5

CONSTRUCTION AND OPERATION DISTURBANCE
BY LAND OWNERSHIP, WASATCH VARIATIONS ALTERNATIVES

Alternative	County, State	Disturbance Area	Total Acres	Private Acres	FS Acres
Bountiful Blvd.	Davis, UT	100' Construction	81.2	69.1	12.1
		50' Operation	40.6	34.5	6.1
Pages Lane	Davis, UT	100' Construction	132.1	110.3	21.8
		50' Operation	66.0	55.1	10.9
	Salt Lake, UT	100' Construction	33.9	33.9	-
		50' Operation	17.0	17.0	-
Subtotal Alternative		100' Construction	166.0	144.2	21.8
		50' Operation	83.0	72.1	10.9
Bountiful Peak	Davis, UT	100' Construction	201.2	105.5	95.7
		50' Operation	100.6	52.7	47.9
	Salt Lake, UT	100' Construction	33.9	33.9	-
		50' Operation	17.0	17.0	-
	Morgan, UT	100' Construction	6.1	-	6.1
		50' Operation	3.0	-	3.0
Subtotal Alternative		100' Construction	241.2	139.4	101.8
		50' Operation	120.6	69.7	50.9

Table 4.3-6

CONSTRUCTION AND OPERATION DISTURBANCE BY LAND USE, WASATCH VARIATION ALTERNATIVES

Alternative	County, State	Disturbance Area	Total Acres	Grazing/ Rangeland Acres	Irrigated Non-Irrigated/ Agriculture Acres	Commercial/ Industrial Acres	Residential Acres
Bountiful Blvd.	Davis, UT	100' Construction	81.2	30.3	-	-	50.9
		50' Operation	40.6	15.2	-	-	25.4
Pages Lane	Davis, UT	100' Construction	132.1	50.9	47.2	6.1	27.9
		50' Operation	66.0	25.5	23.6	3.0	13.9
	Salt Lake, UT	100' Construction	33.9	-	27.8	6.1	-
		50' Operation	17.0	-	14.0	3.0	-
Subtotal Alternative		100' Construction	166.0	50.9	75.0	12.2	27.9
		50' Operation	83.0	25.5	37.6	6.0	13.9
Bountiful Peak	David, UT	100' Construction	201.2	100.6	97.0	-	3.6
		50' Operation	100.6	50.3	48.5	-	1.8
	Salt Lake, UT	100' Construction	33.9	-	33.9	-	-
		50' Operation	17.0	-	17.0	-	-
	Morgan, UT	100' Construction	6.1	-	-	6.1	-
		50' Operation	3.0	-	-	3.0	-
Subtotal Alternative		100' Construction	241.2	100.6	130.9	6.1	3.6
		50' Operation	120.6	50.3	65.5	3.0	1.8

objectives of the plan and scenic designations in the Bountiful Peak area are of sufficient magnitude that amendment of the Forest Plan would require a full planning process. Such an amendment might not be approved as being consistent with overall Forest Plan objectives.

Long-term impacts would occur along the segment between the edge of the National Forest and the UP&L transmission corridor since this passes through an agricultural area. No land use impacts are associated with the segment which follows the transmission corridor.

4.3.1.10 Cultural Resources

4.3.1.10.1 Archaeology

Direct Impacts. No sites are known from the direct impact zone of any of the three WyCal Wasatch Variation Alternatives for that portion where they differ from the Kern River Wasatch Variation.

Indirect Impacts. No sites are known from the indirect impact zone of any of the three alternatives.

Sensitivity. One survey is reported extending adjacent to the Bountiful Boulevard Alternative for a length of 0.25 mile, two surveys cover a 0.42 mile portion of the Pages Land Alternative, and the Bountiful Peak Alternative has had no survey covered. None of the three Wasatch Variation Alternatives has been surveyed at an intensity greater than or equal to 2%, and no surveys have produced sites within the analysis corridor for any of the three alternatives. The three alternatives routes are therefore assigned a cultural (archaeological) sensitivity rating of unknown, just as was the Kern River alternative for segment 2.

4.3.1.10.2 American Indian Concerns

The Ute Indian Tribe of Utah is concerned about impacts to ancestral (archaeological) sites.

4.3.1.11 Paleontological Resources

4.3.1.11.1 Bountiful Boulevard Alternative

The alternative, together with the incorporated Kern River Wasatch Variation segments, would traverse 149.0 miles of significant formations, 4.7 miles of nonsignificant formations, and 0.1 mile of undetermined formations.

4.3.1.11.2 Pages Lane Alternative

The alternative, together with the incorporated Kern River Wasatch Variation segments, would traverse 142.8 miles of significant formations, 10.1 miles of nonsignificant formations, and 0.1 mile of undetermined formations.

4.3.1.11.3 Bountiful Peak Alternative

The alternative, together with the incorporated Kern River Wasatch Variation segments, would traverse 145.8 miles of significant formations and 17.1 miles of nonsignificant formations.

4.3.1.12 Visual Resources

Impacts are discussed using the same criteria as described in FEIR/S, II/4.2.12. See Table 4.3-7 for a summary of visual impacts on the Wasatch Variation Alternatives.

4.3.1.12.1 Bountiful Boulevard Alternative

BB 39.6-40.7, VRM/VQO: FS Class PR
This alternative segment travels through a portion of the Wasatch National Forest between Ward and Holbrook Canyons for a distance of about one mile, and would create a moderate visual impact, slow rejuvenation and a long-term recovery rate. The route is proposed to follow along the ridgeline between the two canyons. As the route descends along the ridgeline, it will be visible to the citizens of Bountiful, as is the existing MFR pipeline route. If the route were to travel in either canyon, it would also be visible, at least to persons travelling along the road servicing flood control structures for Ward and Holbrook Canyon. This impact is significant.

BB 41.0-40.7, VRM/VQO: Not Applicable
This segment follows the ROW for Bountiful Boulevard. Short term adverse impacts will occur during pipeline construction, which will be visible to residences adjacent to this street. If the pipeline is constructed within the roadway ROW, revegetation is not an issue. Therefore, no significant impacts are identified for this part of the segment.

4.3.1.12.2 Pages Lane Alternative

PL 39.6-40.7, VRM/VQO: FS Class PR
This alternative segment travels through a portion of the Wasatch National Forest between Ward and Holbrook Canyons for a distance of about one mile, and would create a moderate visual impact. Slow rejuvenation would result in a long-term recovery rate. The

Table 4.3-7

SUMMARY OF VISUAL IMPACTS, WASATCH VARIATION ALTERATIVES

					Visual Impacts (Miles)		
Milepost	Jurisdiction	Affected Resource	VRM/VQO	Critical Viewpoint	High	Moderate	Low
Bountiful Boulevard Alternative							
39.6-40.7	FS	Wasatch-Cache NF	PR	Bountiful City	-	1.1	-
40.7-46.4	private	Bountiful City	NA	Bountiful City	-	-	5.7
			TOTAL (Miles) OF VISUAL IMPACT		-	1.1	5.7
Pages Lane Alternative							
39.6-40.7	FS	Wasatch-Cache NF	PR	Bountiful City	-	1.1	-
42.9-43.6	FS	Wasatch-Cache NF	PR	Bountiful City	-	-	0.7
			TOTAL (Miles) OF VISUAL IMPACT		-	1.1	0.7
Bountiful Peak Alternative							
36.4-38.4	FS	Wasatch-Cache NF	PR	Local road	-	-	2.0
38.5-46.6	FS	Wasatch-Cache NF	PR	Bountiful Peak Road	-	8.1	-
46.6-47.1	FS	Wasatch-Cache NF	PR	I-15	1.0	-	-
			TOTAL (Miles) OF VISUAL IMPACT		1.0	8.1	2.0

route as proposed follows along the ridgeline between the two canyons. As the route descends along the ridgeline, it will be visible to the citizens of Bountiful, similar to the existing MFR pipeline route. If the route were to travel in either canyon, it would also be visible, at least to persons travelling along the road which services flood control structures for Ward and Holbrook Canyon. This impact is significant.

PL 42.9-43.6, VRM/VQO: FS Class PR
This segment traverses across a corner of the Wasatch National Forest just north of Ward Canyon and just east of the City of Bountiful. Visual impact in this area is considered to be low due to previous modifications including the MFR ROW and off-road vehicle access. Rejuvenation of vegetation in this area is slow and therefore rated as long-term. Impacts are not considered to be significant.

Along the MFR ROW and along Pages Lane, construction activity will create short term adverse impacts because of visibility to residents in the area. Rejuvenation of vegetation will be a problem in the marshy areas and mud flats along the UP&L transmission line, and is rated as long-term. However, due to previous modification in the area, impacts are not considered significant.

4.3.1.12.3 Bountiful Peak Alternative

BP 38.5-47.6, VRM/VQO: FS Class PR
This segment travels through a portion of the Wasatch National Forest characterized by a combination of rugged terrain with high peaks and lower elevation transitional areas. This segment would create a moderate visual impact since the area is generally undisturbed. ~~The route would be visible to hikers and other visitors to the Bountiful Peak area and possibly from the Bountiful Peak Overlook. Slow rejuvenation rates in the forest would result in long term impacts.~~ The widening of the Skyline Drive Road, for approximately 3 miles to accommodate the pipeline construction, would result in high cut and/or fill slopes through very light colored soil and rock. This, along with the pipeline construction down the ridge from Bountiful Peak to the valley, would create a visual scar that could be seen from North Salt Lake to Centerville. Due to the poor revegetation potential on much of this, the scar would be very prominent for many years. The visual impacts for this segment are considered to be significant.

The remainder of this segment traverses the low density urbanized area between Farmington and Centerville, and then through the marsh areas and mud flats along the UP&L transmission line. Although the corridor might be visible to area residents through the marshy areas, and rejuvenation could be long-term, visual impacts are not considered significant because of previous modifications to the area.

4.3.1.13 System Safety and Reliability

The Wasatch Variation Alternatives would be approximately 20 to 30 miles longer than the primary route. Approximately 18 miles of the proposed route are currently under residential, commercial, and industrial development. The presence of a hig-pressure gas pipeline under city streets in close proximity to numerous other utility lines may present a substantial risk of pipeline failure from maintenance and construction work associated with those utilities. The route would pass through the majority of this area in an existing electric transmission corridor. It is possible that a pipeline rupture and subsequent fire or explosion could cause damage to the powerlines. The pipeline will be protected from fault currents as described in FEIR/S, I/4.2.13. The route would also cross both existing gravel mining operation and areas where expanded gravel mining appears likely. Although it is possible that mining operations could pose a system safety impact on the pipeline (e.g., undermining), the actual pipeline route selection and identification should preclude these types of problems.

The first 43 miles of the Wasatch Variation Alternatives ~~are through~~ cross areas of remote rugged terrain with the potential for landslides and also crosses several known fault zones. The last 87 miles cross known active faults which have experienced high-intensity seismic activities in the recent past. Several areas may be prone to liquefaction. As stated above, approximately 18 miles of this section of the route pass through areas currently under development, including Bountiful City, North Salt Lake, Salt Lake City, and West Valley City.

Maintenance and minor repairs to the pipeline may be delayed as a result of seasonal access restrictions imposed by the Forest Service. Weather conditions, natural resource concerns, and management direction provided by approved Forest Plans will dictate when access to the pipeline will be permitted. There could be some effect on the scheduled delivery of gas as a result of these restrictions. However, the Forest Service could waive restirctions if conditions arose that posed a threat of pipeline failure.

The pipeline route crosses through several areas with potential for liquefaction/ground failure, fault rupture, slope instability, and flash flooding. These are discussed in FEIR/S, II/4.4.1.2 and Table 4.4-1.

The many and active geologic hazards along the variation will increase construction and maintenance costs. The pipeline will be susceptible to damage, causing inoperable conditions. Such damage and breaks in operations may occur at frequent intervals, due to geologic conditions and weather patterns.

System safety concerns along the Wasatch Variation alternatives vary in intensity dependant upon the routing.

4.3.1.13.1 Bountiful Boulevard

The Bountiful Boulevard Alternative would be located in the proximity of numerous homes within Bountiful City once the route leaves the Ward Canyon Utility Corridor. However, since the pipeline would be within the ROW of a major city street, it may be insulated from slope instability problems.

4.3.1.13.2 Pages Lane Alternative

The Pages Lane Alternative would be located in the proximity of over 120 residences, an elementary school and a major commercial center after it leaves the Ward Canyon Utility Corridor. Since the ROW would be within a major city street, it may be insulated from major slope instability problems.

4.3.1.13.3 Bountiful Peak Alternative

This alternative would have impacts similar to those discussed for the Wasatch Variation (FEIR/S, II/4.4.1.13) in general.

4.3.2 North Las Vegas Variation

Information on the first 109 miles of the North Las Vegas Variation is presented in the FEIR/S, II/4.4.4. The impact information presented below for tables includes both the information on the 109-mile segment plus the 41-mile extension. The text only discusses the new portion of the North Las Vegas Variation.

4.3.2.1 Air Quality

Air Quality emissions and impacts would be essentially the same as under the proposed primary route which is presented in Section 4.2.1. Total overall construction emissions would be slightly higher due to an increase in length of the variation.

4.3.2.2 Geology

The geologic impacts associated with the North Las Vegas Variation are identical to those in the Kern River North Las Vegas Variation from NLV 0 to 109.5 (FEIR/S, II/4.4.4.2). The geologic impacts associated with geologic hazards, from NLV 109.5 to 151 of this variation, are similar to those described for FEIR/S, II/4.4.4.2. Only flash flooding was recognized as a highly probable potential impact. Neither subsidence nor faulting appear to be a significant geologic hazard along this portion of the variation. See Table 4.3-8 for significant geologic hazards on the North Las Vegas Variation.

Table 4.3-8

SIGNIFICANT GEOLOGICAL HAZARDS, NORTH LAS VEGAS VARIATION

	Las Vegas Shear Zone MP 50-109	Ivanpah to Piute Valley MP 109-151
Liquefaction/Ground Failure	-	-
Surface Fault Rupture	x	x
Slope Instability	-	-
Ground Subsidence	x	-
Flash Flooding	x	x
Avalanche	-	-

4.3.2.3 Soil

See FEIR/S, II/4.2.3 for information on soil impacts. The distribution of potential impacts is presented in Table 4.3-9.

4.3.2.4 Surface Water

The impacts described in FEIR/S, II/4.2.4.1.4 and II/4.4.4.4 are very similar to those associated with this variation.

4.3.2.5 Groundwater

No significant impacts to groundwater would occur along the route of the proposed North Las Vegas Variation. See FEIR/S, II/4.4.4.5.

4.3.2.6 Freshwater Biology

General impacts discussed in FEIR/S, II/4.2.6.4 and II/4.4.6 would also apply to this variation.

4.3.2.7 Terrestrial Biology

4.3.2.7.1 Vegetation

For the portion of the WyCal line (NLV 109.5-151) not covered under the Kern River Proposal, 503.0 acres of vegetation would be disturbed.

Table 4.3-9

DISTRIBUTION OF POTENTIAL SOILS IMPACTS, NORTH LAS VEGAS VARIATION

		Erosion Potential 1/						Reclamation Potential 2/ (miles) 3/		
		Water (miles) 3/			Wind (miles) 3/					
Milepost	Geographic Area	L	M	H	L	M	H	G	F	P
0.0 - 151.0	Mojave Desert	134.0	14.0	3.0	80.0	61.0	10.0	1.0	35.5	114.5

1/ Water Erosion Potential
L(low) = less than 5 tons/acre/year (low probability for significant erosion impacts).
M(moderate) = 5 to 20 tons/acre/year (near even probability for significant erosion impacts).
H(high) = greater than 20 tons/acre/year (high probability for significant erosion impacts).

Wind Erosion Potential
L(low) = low probability for significant erosion impact.
M(moderate) = near even probability for significant erosion impacts. Impact potential also dependent upon site specific exposure to prevailing winds.
H(high) = high probability for significant erosion impacts. Impact potential also dependent upon site specific exposure to prevailing winds.

2/ Reclamation Potential
(Ratings are based upon trenching with no selective soil handling or other mitigation.)
G(good) = good probability for restoring vegetation which will support pre-existing land use. Productivity potential may be somewhat reduced.
F(fair) = near even probability for restoring vegetation which will support pre-existing land use within short periods of time. Time needed for reestablishment is likely to be longer than soils with good potential. Productivity potential may be reduced.
P(poor) = low probability for restoring vegetation which will support pre-existing land use within a short period of time. Time needed for reestablishment is likely to be long. Productivity potential may be reduced.

3/ Cumulative miles for pipeline segment.

Table 4.3-10

VEGETATION TYPES AND DENUDED ACREAGES, NORTH LAS VEGAS VARIATION

Geographic Region	Vegetation Type	Impact[2] Class	Denudation [1] (Acres) Short Term[3]	Long Term[4]	Permanent[5]	Total
Mojave Desert	Mojavean creosote bush scrub	I	0	0	1779.7	1779.7
	Desert saltbush scrub	I	0	0	24.2	24.2
	Wetland/riparian	II	12.0	14.4	0	26.4
		Subtotal	12.0	14.4	1803.9	1830.3
Summary by Impact Class						
	Class	I	0	0	1803.9	1803.9
	Class	II	12.0	14.4	0	26.4
	Class	III	0	0	0	0
	Class	IV	0	0	0	0
		TOTAL	12.0	14.4	1803.9	1830.3

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[1] vegetation loss assuming a 100-foot wide construction ROW and a 50-foot wide operational ROW.

[2] see section 4.2.7.1 Kern proposal for definitions of impact classes.

[3] short-term loss = vegetation loss within community types with fair or better revegetation potential; vegetation loss within total 100-foot wide construction ROW if large woody shrubs or trees not present; vegetation loss short term within the 50-foot wide portion of the construction ROW not used for operation with large woody shrubs and trees present; vegetation loss would not be significant.

[4] long-term loss = loss of vegetation within community types with fair or better revegetation potential containing large woody shrubs or trees present in operational ROW (50-foot wide) which would hamper operations and, therefore, would not be allowed to reestablish in the operational ROW during the life of the project; loss would not be significant.

[5] permanent loss = loss of vegetation within community types with poor or worse revegetation potential; vegetation loss would be significant.

Class I impacts due to difficulty of revegetation would occur to approximately ~~490.9~~ 476.5 acres of Mojavean creosote bush scrub and 12.1 acres of desert saltbush scrub. Class II impacts could occur to 14.4 acres of wetland/riparian vegetation. Plant species of concern likely to be impacted are the same as those discussed in FEIR/S, II for this variation. In addition, habitat for Merriam's poppy (C3) could be disturbed or lost; consequently, the potential for Class II impact on this species as a result of pipeline construction is high.

See Table 4.3-10 for vegetation types and areas of denudation.

4.3.2.7.2 Wildlife

Criteria used to determine significance of impacts associated with construction of the proposed North Las Vegas Variation are the same as presented in FEIR/S, II/4.2.7.2. Classification of impacts is described in Section 4.2.7.2 of this supplement.

General Wildlife. No significant impacts to general wildlife is anticipated as a result of implementation of this variation. Approximately 500 acres of general wildlife habitat would be disturbed during construction of the proposed route, a Class III impact. Increased ORV access could result in further habitat destruction and animal disturbance, a Class III impact.

Wildlife Species of Special Concern. FEIR/S, II/4.4.4.7.2 provides an explanatory narrative of individual wildlife impacts. A quantification of impacts are as follows.

Class I
- Potential loss of 8 desert tortoise.
- Loss of approximately 65 acres of crucial desert tortoise habitat along approximately 4.5 miles of the proposed variation. This includes construction of the Blue Diamond Compressor Station.
- Loss of an unquantified number of Gila monsters.

Class II
- Disturbance of approximately 448 acres of suitable desert tortoise habitat not presently defined as crucial along approximately 37 miles of the proposed route.
- Increased disturbance, death, vandalism, habitat destruction and theft of tortoise due to increased ORV access along the proposed variation.
- Disturbance of desert bighorn sheep along 4.5 miles of crucial summer habitat.
- Potential destruction of any water source within desert bighorn sheep crucial habitat, located within the project ROW corridor.

4.3.2.7.3 Grazing

Criteria used to evaluate potential grazing impacts are the same as described in FEIR/S, II/4.2.7.3. No significant impacts to grazing are anticipated due to project implementation.

4.3.2.8 Socioeconomics

4.3.2.8.1 Population, Housing, and Economic Impacts

The North Las Vegas Variation would essentially result in the same socioeconomic impacts as for the proposed project as analyzed in Section 4.2.8.1. Some housing demands would shift to the Goodsprings area. Given the lack of infrastructure in Goodsprings, it is likely that these demands would be met by longer commuting distances to Henderson or Las Vegas.

4.3.2.8.2 Traffic

Impacts for the portion of the route up to MP 109 are the same as those addressed in the FEIR/S, II/4.4.4.8.2. The North Las Vegas Variation Extension is not anticipated to disturb traffic flow. Interstate 15, S.R. 164, and the Union Pacific Railroad will be crossed by boring under; no impact to traffic is expected to occur.

Access to the pipeline route would be primarily unimproved roads, and jeep trails. Refer to Section 4.2.8.2 of this document for construction methodology and impacts.

4.3.2.8.3 Noise

If the North Las Vegas Variation were constructed by WyCal, a compressor station would be located at Blue Diamond in Clark County, Nevada. No noise sensitive receptors are located within 2,000 meters of the station thus no significant impacts to noise levels would occur during either construction or operation of the station.

The portions of the North Las Vegas Variation previously analyzed in FEIR/S, II/4.4.4.8.3 as well as those portions east of MP 109 of the North Las Vegas Variation have no sensitive noise receptors. Construction noise therefore is not considered a significant impact.

4.3.2.8.4 Recreational Resources

Since the majority of the state's population (57.8%) reside in Clark County, recreational use of public land in Southern Nevada is high [BLM 1985]. Construction of the pipeline would create a short-term adverse impact to those enjoying the recreational opportunities offered by BLM land.

Off-road vehicle access to construction ROWs would require control since management of ORV use of public lands is a high priority with government, private interest groups, and individuals.

4.3.2.9 Land Ownership/Use

Impacts for the portion of the route up to MP 109 are the same as those addressed in FEIR/S, II/4.4.4.9. No significant land use impacts have been identified for this alternative. Slight variations in the proposed route may be needed to avoid specific land use conflicts such as mining operations, but these should be able to be accommodated within the analyzed corridor. Table 4.3-11 shows the number of acres of disturbance by land ownership for this alternative. Table 4.3-12 shows the acres of disturbance by land use.

4.3.2.10 Cultural Resources

4.3.2.10.1 Archaeology

Impact assessment of the first four sensitivity segments (NLV 0-100) of the WyCal North Las Vegas Variation is unchanged from the Kern River assessment (see FEIR/S, II/4.4.4.10.1). The last segment (NLV 100-109) of the Kern River proposal, which contained no reported sites, was incorporated into segment 5 of WyCal's proposed extension of the variation. The impact discussion presented here deals only with the Blue Diamond Compressor Station and the WyCal extension (NLV 109-150) together with the last nine miles of the Kern River North Las Vegas route; the two new segments are referred to here as Segment 5 (NLV 100-125) and Segment 6 (NLV 125-150).

Direct Impacts. Only one known site, a historic railbed, crosses the zone of direct impact. Only about 2.5% of the direct impact zone has been surveyed.

Indirect Impacts. Only one known site, a rockshelter and associated midden, is located within the indirect impact zone of Segments 5 and 6. A marked portion of the Old Spanish Trail lies in the indirect impact zone of the Blue Diamond Compressor Station.

Due to the nearness of Ivanpah and Roach Lakes, Segment 5 is assigned a sensitivity rating of moderate, in spite of its low site density. Segment 6 is assigned a low sensitivity rating. The single high sensitivity segment lies to the north, in the portion of the North Las Vegas Variation identical to Kern River's route (see FEIR/S, II/4.4.4.10.1).

Table 4.3-11

CONSTRUCTION AND OPERATION DISTURBANCE BY LAND OWNERSHIP, NORTH LAS VEGAS VARIATION

County, State	Disturbance Area	Total Acres	Private Acres	BLM Acres	DOD Acres	Indian Acres	BOR Acres
Clark, NV	100' Construction	1824.2	264.2	1309.0	36.4	172.1	42.5
	50' Operation	922.1 1/	132.2	664.5 1/	18.2	86.0	21.2

1/ Includes 10 acres for compressor station.

Table 4.3-12

CONSTRUCTION AND OPERATION DISTURBANCE BY LAND USE, NORTH LAS VEGAS VARIATION

County, State	Disturbance Area	Total Acres	Grazing/ Rangeland Acres	Irrigated Non-Irrigated Agriculture Acres	Residen- tial Acres	Other 1/ Acres	Commercial/ Industrial Acres
Clark, NV	100' Construction	1824.2	1545.4	12.1	218.2	36.4	12.1
	50' Operation	922.1 2/	782.7 2/	6.1	109.0	18.2	6.1

1/ Nellis Air Force Base
2/ Includes 10 acres for compressor station.

4.3.2.10.2 American Indian Concerns

Several American Indian groups are concerned about impacts to traditional ethnographic use areas. Concerns about site-specific impacts are limited to known ancestral (archaeological) sites. Other concerns affecting only the Kern River North Las Vegas route are discussed in the FEIR/S, II/4.4.4.10.2.

4.3.2.11 Paleontological Resources

The WyCal North Las Vegas Variation would traverse 139.6 miles of formations determined to be sensitive and 10.3 miles of formations determined nonsensitive. Of this length, 31.4 miles of significant formations and 9.0 miles of nonsignificant formations are represented by new alignments.

4.3.2.12 Visual Resources

Visual impacts of the North Las Vegas Variation are discussed in FEIR/S, II/4.4.4.12. Impacts for the WyCal Alternative from NLV 109.5 to 151 would be similar, and would include short-term visual impacts due to construction and maintenance. Although rejuvenation of vegetation is a problem in disturbed areas due to the dry climate, impacts are not considered to be significant. Because of the slowness of rejuvenation, it is recommended that the area of disturbance be minimized to further limit visual impacts.

4.3.2.13 System Safety and Reliability

The North Las Vegas Variation including the WyCal segment would be approximately ~~14~~ 33 miles longer than the primary route. This variation would pass through Husite, a planned development area which includes high- and low-density residential areas and a residential area north of Las Vegas. The route crosses the Las Vegas Shear Zone. No other unique geologic features were identified along this route.

System safety concerns would remain unchanged from the Kern River North Las Vegas Variation FEIR/S, II/4.4.4.13. The variation would be 41 miles longer and may increase the potential for rupture.

4.4 CUMULATIVE IMPACTS

Cumulative impacts result when a project is added to an area in which other developments exist or are proposed. Although the impacts from the separate projects might be minor, the impacts from all projects in an area could be significant. The interrelated projects presented in FEIR/S, I/2.15 and II/2.8, along with the WyCal project, were analyzed for cumulative impacts.

The resources which would sustain measurable cumulative impacts from the addition of the WyCal proposal include land stability, aquatic resources, vegetation, wildlife, socioeconomics, cultural resources, and visual resources. Table 4.4-1 lists the major overlapping scheduled projects and the cumulative effects the WyCal project would produce.

Vegetation resources could be affected in various ways by an accumulation of habitat loss in the vicinity of all of the projects listed. The cumulative effects on vegetation loss in these areas would be significant to the timber and Mojavean creosote bush scrub communities since revegetation of these community types would be a slow process. Vegetation resources could be affected in various ways by an accumulation of habitat loss in the immediate vicinity of the Celeron All American pipeline. The All American pipeline route would be closely followed by the WyCal pipeline between the Tehachapi Mountains and the Old Woman Mountains. The cumulative effects on vegetation loss in the area would be significant to the Mojavean creosote bush scrub community since regeneration of this vegetation community is a slow process.

The same portion of the route would also have a cumulative effect on wildlife species, particularly the desert tortoise. Desert tortoise habitat begins at the eastern edge of the Tehachapi Mountains and would extend to the point of diversion between the two routes around the Old Woman Mountains. The effects of desert tortoise habitat reduction and the potential for impacting significant numbers of desert tortoise could almost be doubled.

In addition to these impacts to vegetation and wildlife caused by the All American project, the Mead/McCullough-Victorville/Adelanto electrical transmission project would impact similar types of habitat although the WyCal route would rarely occur in exactly the same areas as the two projects. However, the cumulative effects to the habitats would be significant.

The USFWS is aware of several other projects in the San Joaquin Valley where biological surveys have documented the occurrence of the federally listed blunt-nosed leopard lizard, giant kangaroo rat, or San Joaquin kit fox. (See FEIR/S, II/Appendix G for a listing of these projects.) The cumulative effects of these known actions pose a significant threat towards the eventual recovery of these species. Taken collectively, all land modifying projects within the area threaten the continued existence of these species. The construction and use of the WyCal pipeline would significantly contribute towards the erosion of extant wildland habitats and reduction in listed species populations.

Table 4.4-1

CUMULATIVE IMPACTS, WYCAL PIPELINE PROPOSAL

Route	Project	Project Description	Location	Target Construction Period	Employment	Potential Conflicts With Required Coordination With Proposed Action
WyCal (Northern Leg)	Central Utah Project (CUP)	Six foot diameter pipeline to transport Uinta basin water to the Wasatch Front: reservoir portals, aqueducts, tunnels, access roads, and operation and maintenance buildings	MP 156-159 NL	Unknown	20-40	Overlapping construction schedule requiring coordination of facility locations and rehabilitation
WyCal (Northern Leg)	Utah Power & Light Company (UP&L)	A 345 Kv transmission line, and proposed substation near MP 381	MP 351-416 NL	Present-1990	20-40	Corridor sharing coordination for 65 miles involving vegetation clearing, access roads, rehabitation, and construction scheduling. Coordination of facility locations.
WyCal (Northern Leg)	InterMountain Power Project (IPP)	500 Kv transmission line	MP 337-449 NL MP 485-494 NL	Completed	N/A	Corridor sharing coordination for 236 miles involving vegetation clearing, access roads, and rehabilitation.
WyCal (Northern Leg)	Nevada Power Company	Two 230 Kv transmission lines	MP 540-610 NL	Completed	N/A	Corridor sharing coordination for 51 miles involving vegetation clearing, access roads, and rehabilitation.
WyCal (Western Leg)	Mead/McCullough-Victorville/Adelanto Transmission Project	500 Kv transmission line	MP 100-160 WL	Present to 1991	20-40	Corridor sharing coordination for 60 miles involving vegetation clearing, access roads, and rehabilitation.
WyCal (Western Leg)	Celeron/All American and Getty Pipeline Projects	30 inch oil pipeline	MP 191-230 WL MP 245-287 WL	Completed	N/A	Corridor sharing coordination for 113 miles involving vegetation clearing, access roads, and rehabilitation.
WyCal (Western Leg)	PG&E	dual 34-inch pipelines	MP 1.3-115 WL	Completed	N/A	Corridor sharing coordination for 114 miles involving vegetation clearing, access roads, and rehabilitation.

Table 4.4-1 (continued)

CUMULATIVE IMPACTS, WYCAL PIPELINE PROPOSAL

Route	Project	Project Description	Location	Target Construction Period	Employment	Potential Conflicts With Required Coordination With Proposed Action
WyCal (Western Leg)	El Paso Natural Gas Company	16-inch pipeline	MP 0.0-14.0 TSL	Completed	N/A	Corridor sharing coordination for 14 miles involving vegetation clearing, access roads, and rehabilitation.
Wasatch Variations	MFR Natural Gas Pipeline	14 inch pipeline	MP 0-40 WV	Completed	N/A	Corridor sharing coordination for 40 miles involving vegetation clearing, access roads, and rehabilitation. Disturbance to areas that have or are being rehabilitated.
Wasatch Variations	Bountiful City Transmission Line	46 Kv transmission line	MP 27-40 WV	Present-Mid 1989	20	Corridor sharing coordination for 13 miles involving vegetation clearing, access roads, and rehabilitation.
Wasatch Variations	Municipal Watershed Developments	Pipelines, spring boxes, treatment facilities, building, etc.	MP 43-44 WV	Present to 1990	10	Pipeline corridor would cross through the water development area with potential conflicts to springs, water pipelines, water quality, and water distribution. Cumulative impacts to soil and slope stability.
North Las Vegas Variation	Mead/McCullough-Victorville/Adelanto Transmission Project	500 Kv transmission line	MP 100-130 NLV	Present to 1991	20-40	Corridor sharing coordination for 30 miles involving vegetation clearing, access roads, and rehabilitation.

Cumulative impacts would also occur to soils and land stability along those portions of the WyCal proposal that are adjacent to or overlap the Central Utah Project facilities or MFR natural gas pipeline ROW and Bountiful City electrical transmission line (Wasatch Variation and Alternatives). These interrelated projects cross steep, rugged terrain with soil and land stability problems. Cumulative impacts would occur to these resources with each new use. The watershed values of the west slopes of the Wasatch range could be damaged, with resulting floods and debris flows into portions of residential areas of south Davis County.

A more restricted cumulative impact would involve water development and water quality conflicts particularly associated with the municipal watershed developments on the Wasatch Variation and Alternatives. Cumulative effects of pipeline construction could occur to streams and springs regarding quantity and quality of water.

Additional cumulative impacts that could result from these projects would be in the area of socioeconomics. The employment requirements, housing needs, transportation need and increased tax benefits would be interrelated. Employment requirements for the Mead/Victorville power project added to those discussed above could probably put a strain on the available employment market, particularly in the isolated areas between the Tehachapi Mountain and Old Woman Mountains and to the isolated portions of central and southern Utah.

Housing needs on a temporary basis could result in a local short-term shortfall. If all of the projects were in construction simultaneously, the effects on the temporary housing market in most towns along the route would be stressed. Variations in construction scheduling to avoid overlaps should alleviate many of these problems. Transportation needs would be similar; appropriate scheduling should also resolve these problems.

Cumulative impacts to the tax base in San Bernardino County would be significant. Taken separately, none of the projects would cause a significant increase to the tax base. However, the cumulative effects of three major projects within this portion of San Bernardino would significantly lower the tax burden to the resident population.

Impacts to visual resources would increase with each new project. The cumulative impacts would change the visual quality objectives established by the Forest Service for several areas crossed by the mainline on the Uinta National Forest and the Wasatch Variations and Alternatives on the Wasatch-Cache National Forest. These visual objectives were established to protect scenic views from critical viewpoints, i.e., major highways, recreation trails and sites, and residential areas. The WyCal pipeline would parallel portions of the Intermountain Power Project (IPP) 500 kV and UP&L 345 kV transmission lines from north and central Utah to points south. The line would also parallel portions of the All-

American Pipeline in the Mojave Desert. All of these lines would result in the need for additional ROW width, which in turn would affect visual quality objectives for the areas being crossed. However, the presence of transmission towers would present more of a visual intrusion than a buried pipeline. These visual impacts coupled with the transmission towers of the Mead/Victorville transmission project would draw attention to the pipeline ROW.

Implementation of the project could potentially destroy some unknown subsurface historic or prehistoric remains. There could be a loss of knowledge because any sites excavated as a result of the project would be precluded from future scientific studies. This would be particularly significant in the Mojave desert where current information on cultural adaptations is scarce.

These same types of cumulative impacts would also occur with paleontological resources. Again, research in the area is sparse; losses to formations prior to detailed studies may result to data gaps which cannot be recovered.

As stated previously, the FEIR/S addressed cumulative impacts in that it considered the environmental impacts of each of the separate proposed actions (i.e., the Kern River project and the Mojave project) when added to other past, present, and reasonably foreseeable future actions. These projects were identified on pages 2-42 and Section 4.9 of Volume I, pages 2-59 and Section 4.6 of Volume II, and Appendix G of Volume II of the FEIR/S. It has been suggested by Southern California Gas Company (SoCal) that the FEIR/S and/or this Supplement consider the environmental effects associated with granting one, two, or three of the applications, i.e., the cumulative impacts of constructing two or more pipelines, either simultaneously or separately. The staff agrees that it should be considered; however, the staff disagrees that this is a reasonable assumption to warrant detailed analysis.

Cumulative impact is defined in the Council on Environmental Quality (CEQ) regulations for implementing NEPA as the impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions.

Tables 1.1-1 and 1.1-3 of Volume I of the FEIR/S identify a projected need for 600-825 MMcfd of additional natural gas for steam generation by 1990. Other projections have been identified by the various parties in Phase I of the proceeding. The California Public Utilities Commission in its August 10, 1987, motion to consolidate the Wyoming-California Pipeline Corporation application argued in part that the EOR market will only support one pipeline. The CPUC stated that "Due to constraints imposed by the limited foreseeable demand, construction of more than one of these three proposed lines is not reasonably or economically possible". On August 24, 1987, SoCal answered CPUC's motion and agreed with CPUC's assessment that the proposals serve the same market and are mutually exclusive. Mojave and Kern River have both testified that construction of both pipelines is a highly improbable event. The FEIR/S takes no position on the accuracy of the market projections nor does it take any position on any other issue associated with need. These were the subject matter of Phase I hearings previously before FERC Judge Benkin. FERC staff witness Richard W. Foley specifically identifies in his prepared direct testimony that demonstrations of gas supply and market need are fundamental elements missing from each applicant's application and that evidence of a threshold throughput of 400 MMcfd for delivery to the EOR market must be provided to the Commission via gas supply and transportation contracts. These volumes are even lower than the volumes proposed separately by any of the applicants. In short, there has been no demonstrated need provided in the record to date, and one could not reasonably assume the need for 1,300 MMcfd (Kern River plus Mojave) or 1,850-1,950 MMcfd (Kern River plus Mojave plus either El Dorado or WyCal). Absent this determination of need, the assumption of potential multiple projects is not a reasonable one, which is required under the definition of "cumulative impact." Staff is unaware of any evidence in the record of the proceeding that it is reasonably foreseeable that more than one pipeline would be built to serve the EOR market.

This Supplement will therefore not conduct such an analysis. The reader, however, does have the option of adding up the impacts associated with each individual project and come up with a hypothetical cumulative impact which may or may not be associated with the construction of two or more of the pipeline projects.

4.5 PLANNED AND RECOMMENDED MITIGATION MEASURES

See FEIR/S, III Supplement/3.1 for general and specific mitigation measures. WyCal has adopted all the mitigation measures as part of its proposal with the exception of Measure Nos. 144 and 152 which recommended the use of the Wasatch Variation and the North Las Vegas alternative route.

4.6 UNAVOIDABLE ADVERSE IMPACTS

Implementation of the applicable mitigation measures presented in Section 3.1 of Vol. III Supplement would reduce the impacts associated with the WyCal proposal and the alternatives. Those significant impacts that would remain following mitigation are presented below in Table 4.6-1. Only those disciplines with significant impacts prior to mitigation are included in Table 4.6-1.

Table 4.6-1

SIGNIFICANT ADVERSE IMPACTS, WYCAL PIPELINE PROPOSAL

Discipline	Significant Impact	Mitigation [1] Measures	Effectiveness	Residual Significant Impact
GEOLOGY				
Construction and operation	Significant impact caused by slope instability and avalanche could occur in Wasatch Mountain portion of mainline and the Tehachapi Mountains	4, 5, 7, 8, 9, 10, 11, 12, 155, 156, and 157	Implementation of appropriate controls would minimize significant impact	Yes
	Significant impact caused by hydrocompaction could occur in the Mettler area and within the San Joaquin Valley	6	Reduce hydrocompaction potential to minimal levels	No
	Potential ground rupture at fault crossings including Wasatch, Garlock White Wolf and Edison	4, 5, 8, 9, and 11	Ground motion parameters will be developed and used in seismic design of the pipeline and ancillary facilities	No
SOILS				
Construction and operation	Significant water erosion of soils could occur along portions of the route between Wyoming and California. Highest potential would occur in areas traversing mountains or steep hills	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34	Water erosion potential will be decreased and probability for successful revegetation will be improved	Yes
	Significant wind erosion of to soils could occur along all portions of the route particularly in the Mojave Desert	13, 15, 17, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, and 34	Probability for successful reclamation will be increased	Yes
SURFACE WATER				
Construction and operation	Probability of significant surface runoff increasing sediment load and decreasing water quality particulary in the steep terrain of the Wasatch and Tehachapi Mountains, Kern River, and Poso Creek	35, 36, 37, 38, 44, 45, 46, 47, 48, 49, 50, 51, 158, and 159	Reclamation potential of some soils on steep slopes may be so poor that stabilization may take 5 to 10 years	Yes
	Possibility of significant impact caused by hydrostatic test water withdrawal and discharge	39, 40, 41, 42, and 43	Minimize scouring and reduce increased sedimentation to streams, minimize downstream impact on water availability	No

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[1] Numbers refer to mitigation measures listed in Section 3.1 of Volume III.

Table 4.6-1 (continued)

SIGNIFICANT ADVERSE IMPACTS, WYCAL PIPELINE PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
GROUNDWATER Construction and operation	Possibility of significant impacts to ground water caused by contamination due to fuel or chemical spills in shallow groundwater areas	49, 52	Reduce potential for spills and avoid shallow ground water areas	No
	Possible adverse impact on springs	53	Damage to important springs due to grading would be minimized	No
FRESHWATER BIOLOGY Construction and operation	Potential significant impacts could occur from construction activities at 17 stream crossings in the Middle Rocky Mountains region, particularly the Provo River and Beaver Creek which cross habitats of sensitive species	54, 55, 56, and 160, in addition to measures outlined for surface water	Impacts could be reduced, but steep slopes would remain as severe reclamation problem areas and some sedimentation would still occur	Yes
TERRESTRIAL BIOLOGY Construction and operation	Loss of wetland and riparian vegetation would occur portions of the entire route particularly along the Strawberry, Bear and Weber Rivers in Utah, the Las Vegas Wash in Nevada, and the Kern River along the Kern Lateral	56, 57, 58, 59, 60, 61, 62, 64, 69, 70, and 71	Successful implementation would greatly reduce magnitude of impacts	No
	Loss of plant species of special concern and habitat could occur along the entire route, particularly in the Basin and Range, Mojave Desert, and San Joaquin Valley Regions	57, 58, 61, 63, 69, 70, 72, 73, 74, and 161	Realignment to avoid problem areas in the only way to effectively minimize impacts. Restricted access would enhance the probability of successful reclamation	No
	Loss of wildlife species of special concern and habitat could occur along portions of the entire route particularly affecting species in the Wyoming Basin, the Mojave Desert, and the San Joaquin Valley	75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 86, 87 88, 89, 90, 91, 162, 163, and 164	Reduction of stress and impacts during critical time periods would minimize overall effects on the populations. Immediate revegetation replaces lost habitat with less impact on species. Field surveys define areas to avoid and/or regulate timing of activities	Yes
	Loss of individual desert tortoise and their habitat	76, 77, 78, 80, 82, 84, 85, 86, 87, 88, 89, 90, and 91	Reduce impacts to individuals and habitats	No

Table 4.6-1 (continued)

SIGNIFICANT ADVERSE IMPACTS, WYCAL PIPELINE PROPOSAL

Discipline	Significant Impact	Mitigation 1/ Measures	Effectiveness	Residual Significant Impact
LAND USE/OWNERSHIP Construction and operation	Land use/ownership conflicts	102, 103, 104, 105, 165, 166, 167, and 168	Reduce impacts to individuals and and reduce land use/ownership conflicts	Yes
CULTURAL RESOURCES Construction and operation	Potential loss of significant cultural resources and the research potential which could be permanently destroyed	106 and 107	Gain as much non-redundant information and follow guidelines for research established in the technical report	No
PALEONTOLOGICAL RESOURCES Construction and operation	Potential loss of significant fossil finds and reduction of significant fossiliferous formations. This would result in a permanent loss of the resource.	108	Reduce impacts by monitoring would allow some knowledge on the formation which would allow assessment of the formation for future research	No
VISUAL RESOURCES Construction and operation	Loss of visual environment and degradation of established VRM or VQO class could occur.	109 and 110	Reduce impacts to the visual environment to acceptable levels by following contours, revegetating, etc.	Yes

4.7 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term is defined as the construction period of the WyCal proposal plus one year for ROW rehabilitation. Long-term is defined as the remaining life of the project through abandonment and reclamation; this would be approximately 40 years. Following completion of project construction and rehabilitation of the ROWs no significant decreases in the productivity of the project area are expected. Many of the significant impacts associated with the WyCal project would be short-term and would cease to be significant following ROW rehabilitation. A summary of short- and long-term impacts is presented in Table 4.7-1.

4.8 IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction and operation of the WyCal proposal and all alternatives could result in either the irreversible or irretrievable commitment of certain resources. An irreversible commitment of a resource is one which cannot be changed once it occurs; an irretrievable commitment means that the resource cannot be recovered or reused. Irreversible and irretrievable impacts are summarized in Table 4.8-1. No resources will be overcommitted by the construction or operation of the project.

4.9 GROWTH INDUCING IMPACTS

As a result of project implementation, an increased supply of natural gas would be made available to the Kern County area. Assuming favorable economic conditions (increased oil prices), this could lead to an acceleration of the shift to natural gas combustion in Thermally Enhanced Oil Recovery (TEOR) steam generation and cogeneration plants. Since natural gas combustion would result in decreased NO_x emissions, there is a potential for a net air quality benefit. The photochemical modeling results show that reduced emissions in NO_x, hydrocarbon emissions, and ozone levels would occur. The maximum benefits were predicted to occur in southeast Kern County. However, since the ozone peaks predicted with these reduced emissions would still be above the federal standard, additional emission control measures for nitrogen oxides and hydrocarbon would be necessary to attain the standard.

Table 4.7-1

SHORT-TERM AND LONG-TERM IMPACTS RESULTING FROM THE WYCAL PIPELINE PROPOSAL

Resource	Relationship of Short-Term Use of Environment and Long-Term Productivity
AIR QUALITY	The project would not significantly deteriorate existing air quality in the project area on the long-term, but would cause a short-term impact during the construction phases.
GEOLOGY	Impacts caused by slope stability problems would represent significant short-term impact; some significant long-term impacts are anticipated.
SOILS	During construction there would be short-term losses of soil due to erosion; some significant long-term impacts are anticipated to continue after construction.
SURFACE WATER	There would be short-term impacts to surface water during construction; ~~no~~ some significant long-term impacts are anticipated.
GROUNDWATER	No significant short-term or long-term impacts are anticipated.
FRESHWATER BIOLOGY	~~No significant short-term or long-term impacts are anticipated.~~ There would be short-term impacts to freshwater biology during construction; ~~no~~ some significant long-term impacts are anticipated.
VEGETATION	All vegetation types crossed by the pipeline would suffer short-term impacts. Oak woodlands and desert scrubland would not regenerate within the life of the project (40 years) and would suffer long-term impacts.
WILDLIFE	Losses to desert tortoises and other species of special concern as well as general wildlife species impacted would suffer short-term decreases in local populations. Long-term productivity ~~would~~ of certain species may be impaired.
GRAZING	Destruction of forage would be a temporary impact that could change grazing patterns or alter management system for one to three grazing seasons.

Table 4.7-1 (continued)

SHORT-TERM AND LONG-TERM IMPACTS RESULTING FROM THE WYCAL PIPELINE PROPOSAL

Resource	Relationship of Short-Term Use of Environment and Long-Term Productivity
SOCIOECONOMICS	In the short-term, construction of the project would provide provide employment for 4,900 workers and result in increased spending in local areas. In the long-term, operations would employ 45 workers and increased property tax revenues would be realized by the counties crossed by the pipeline.
TRAFFIC	There would be no short-term or long-term impacts to transportation.
NOISE	Short-term impacts would occur to nearby residences during pipeline construction. There would be no significant long-term impacts.
RECREATION	Short-term disruptions of recreation activities would occur. No significant long-term impacts would occur.
LAND USE	Short-term disruptions of agriculture would occur. Long-term impacts to orchards and and vineyards would occur. Short-term and possibly long-term impacts to residences within 50' of the pipeline would occur.
CULTURAL RESOURCES	Disturbance or destruction of cultural resources could result in the loss of some scientific understanding which would be both a short-term and long-term impact.
PALEONTOLOGY	Disturbance or destruction of paleontological resources would result in the loss of some scientific understanding which would be both a short-term and long-term impact.
VISUAL RESOURCES	Short-term impacts to visual resources would occur during construction of the pipeline and compressor station. Some impacts would remain for the life of the project.
SYSTEM SAFETY	A major pipeline break could potentially occur during pipeline operation. Effects to sensitive resources could last from a few days to several years.

Table 4.8-1

COMMITMENT OF RESOURCES RESULTING FROM THE WYCAL PIPELINE PROPOSAL

Resource	Irreversible	Irretrievable	Comment
AIR QUALITY	no	no	No significant long-term commitment of resources
GEOLOGY	yes	yes	Slope stability problems along portions of the route would cause both irreversible and irretrievable commitment of resources.
SOILS	no	yes	Soil losses caused by both water and wind erosion would be irretrievable
SURFACE WATER	no	no	No significant long-term commitment of resources
GROUNDWATER	no	no	No significant long-term commitment of resources
FRESHWATER BIOLOGY	no	no	No significant long-term commitment of resources
VEGETATION	no	yes	The losses of oak woodlands and desert scrubland would be irretrievable. Oak woodlands and desert scrubland would not regenerate within the life of the project (40 years). Riparian habitat might not recover to former state. These could be considered long-term commitments of resources.
WILDLIFE	no	yes	Losses to desert tortoise and other species of special concern as well as general wildlife species would be irretrievable. This could be considered long-term commitments of resources.
GRAZING	no	yes	Destruction of forage would change grazing patterns or alter management systems for one to three grazing seasons.

Table 4.8-1 (continued)

COMMITMENT OF RESOURCES RESULTING FROM THE WYCAL PIPELINE PROPOSAL

Resource	Irreversible	Irretrievable	Comment
SOCIOECONOMICS	no	no	No significant long-term commitment of resources
TRAFFIC	no	no	No significant long-term commitment of resources
NOISE	no	no	No significant long-term commitment of resources
LAND USE	no	yes	Commitment of agricultural land would occur for the life of the project. These losses would be irretrievable.
CULTURAL RESOURCES	yes	yes	Disturbances or destruction of cultural resources would be both an irreversible and irretrievable commitment of resources.
PALEONTOLOGICAL RESOURCES	yes	yes	Disturbances or destruction of paleontological resources would be both irreversible and irretrievable commitment of resources.
VISUAL RESOURCES	no	yes	Some impacts to visual resources would remain for the life of the project. This would be an irretrievable commitment of resources.
SYSTEM SAFETY	yes	yes	Major irreversible and/or irretrievable commitment of resources could occur to vegetation, wildlife, and land use if a major pipeline rupture were to occur.

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PERSONAL COMMUNICATIONS AND CORRESPONDENCE FOR THE WYCAL PIPELINE PROPOSAL
Land Use and Socioeconomics Research
April through May, 1988

Name of Person Contacted	Title, Agency	Location, City or County
ARIZONA		
Gey, Tom	Bureau of Land Management	Kingman
Gordon, Katie	Arizona State Land Department	Phoenix
Urke, Beverly	Arizona State Land Department	Phoenix
CALIFORNIA		
Garcia, Nora	Chairperson, Fort Mojave Tribal Council	Needles
NEVADA		
Land Staff	Bureau of Land Management	Las Vegas
Malpass, David	Howard Hughes Properties	Las Vegas
Regional Director	Bureau of Reclamation	Boulder City
Smithe, Valerie	Bureau of Reclamation	Boulder City
Tilzey, Ed	Bureau of Land Management	Las Vegas
UTAH		
Balling, Jack	City Engineer	Bountiful
Barns, Jerry	Salt Lake County Planning Dept.	Salt Lake City
Burton, Barry	Davis County Planning Department	Farmington
Chirstian, Lorene	Bureau of Reclamation, Upper Colorado Regional Office	Salt Lake City
Hale, David	City Manager	Centerville
Heaton, Garth	Wasatch-Cache National Forest	Salt Lake City
Mayor	City Hall	West Bountiful

PERSONAL COMMUNICATIONS AND CORRESPONDENCE FOR THE WYCAL PIPELINE PROPOSAL
Land Use and Socioeconomics Research
April through May, 1988

Name of Person Contacted	Title, Agency	Location, City or County
Scott, Robert	Farmington City Planning Dept.	Farmington
Wahlen, Brett	City Manager	Woods Cross
Wood, Collin	City Manager	North Salt Lake
Young, Stephen	Planner, Morgan County Planning Dept.	Morgan City
WYOMING		
Arbeiter, Pat	BLM Kemmerer District	Kemmerer
Farly, Dennis	Uinta County Planning Division	Evanston
Kimmel, Paul	Wyoming State Lands	Cheyenne
Reed, Janet	Lincoln County Office of Planning and Development	Kemmerer
Truden, Mike	Bureau of Land Management	Kemmerer

appendices

APPENDIX A

CHARACTERISTICS OF THE SOIL MAPPING UNITS

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)^a	Depth Class^f	Texture^b	Erosion Potential Water^c	Erosion Potential Wind^d	Reclamation Potential Limitations^e	Cropland
WYCAL MAINLINE									
Wyoming Basin and Middle Rocky Mountains									
0-0.5 1.5-12.5	Haterton-Teagulf-Westvaco Association: shallow and moderately deep, well drained, loamy soils; on undulating to hilly upland plains.	Haterton	5-30	S	Loam, clay loam	L-H	M	Poor: quantity	None
		Teagulf	5-20	MD	Sandy Loam	L-H	M	Fair: quantity	None
		Westvaco	5-20	MD	Sandy clay loam, clay loam	L-M	M	Poor: saline/alkaline	None
0.5-1.5	Dines-Chrisman-Fluvents Association: very deep, well to somewhat poorly drained, loamy soils; on nearly level floodplains	Dines	0-3	VD	Silt loam, silty clay loam	L	M	Fair to poor: Saline/alkaline	None
		Chrisman	0-3	VD	clay	L	M	Fair to Poor: clayey, saline/alkaline	None
		Fluvents	0-3	VD	Sandy Loam to clay loam	L	M	Good to Poor: sometimes saline/alkaline	None
12.5-18.5 24.0-58.25	Blazon-Rickman-Pinelli Association: shallow to very deep, well drained, loamy and clayey soils; on gently sloping to very steep ridges, sideslopes and valleys.	Blazon	5-50	S	Loam, clay loam	L-VH	M	Poor: quantity	None
		Rickman	3-30	MD	Loam, clay loam	L-H	M	Fair: quantity	None
		Pinelli	3-30	VD	Clay loam, clay	L-H	M	Fair: clayey texture	None
18.5-24.0	Havre-Quealman Association: very deep, well drained, loamy soils; on nearly level floodplains.	Havre	0-3	VD	Loam	L	M	Good to Fair: sometimes saline/alkaline	None
		Quealman	0-3	VD	Fine sandy loam	L	M	Good to Fair: sometimes saline/alkaline	None
WASATCH VARIATION, BOUNTIFUL BOULEVARD									
Middle Rocky Mountains									
0-5	Yeates Hollow-Manila-Henefer Association: deep and very deep, well drained, very gravelly and clayey soils; on moderately steep to steep mountains and valley sideslopes.	Yeates Hollow	15-60	D	Very gravelly or very cobbly clay loam and clay	M-H	L	Fair to Poor: gravels, cobbles, clayey texture, slope	None
		Manila	15-60	VD	Clay, clay loam	M-VH	L	Fair to Poor: clayey texture, slope	None
		Henefer	15-60	VD	Clay, clay loam, gravelly clay	M-VH	L	Fair to Poor: clayey texture, slope	None
5-14 16-23	Richsum-Cutoff Family-Vicking Association: moderately deep and deep, well drained, loamy and very gravelly soils; on sloping to to steep mountains and valley sideslopes.	Richsum	15-70	MD	Loam, clay loam	M-VH	L	Fair to Poor: quantity, slope	None
		Cutoff Family	15-70	D	Very gravelly sandy loam and loam	M-VH	L	Fair to Poor: slope	None
		Vicking	10-40	VD	Clay loam, loam	M-H	L	Fair to Poor: slope	Some

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)^{a}	Depth Class^{f}	Texture^{b}	Erosion Potential Water^{c}	Erosion Potential Wind^{d}	Reclamation Potential Limitations^{e}	Cropland
14-16	Sowcan-Pringle-Watkins Ridge Association: very deep, somewhat poorly to well drained, loamy and very gravelly soils; on nearly level to sloping bottomlands and alluvial fans.	Sowcan	0-5	VD	Loam, fine sandy loam over very gravelly sand	L	M	Fair: very gravelly sand substratum	Some
		Pringle	0-5	VD	Stratified loamy over sand and gravel	L	L	Fair: sand and gravel substratum	Some
		Watkins Ridge	0-10	VD	Loam, clay loam	L	M	Good	Some
23-26 30.5-32.5	Bertag-Donner-Yeates Hollow Association: deep and very deep, well drained, clayey and cobbly soils; on sloping to steep foothills and mountain footslopes.	Bertag	10-40	VD	Silty clay loam, clay loam, clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Donner	10-40	MD	Clay loam, silty clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Yeates Hollow	6-50	D	Cobbly and very cobbly clay loam and clay	L-H	L	Fair to Poor: cobbles, slope	None
26-29	Henoit-Kilfoil Association: very deep and moderately deep, well drained, very gravelly and loamy soils; on very steep mountain slopes and canyon walls.	Henoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels	None
		Kilfoil	40-60	MD	Clay loam, gravelly loam	H-VH	L	Poor: slope	None
29-30.5	Eastcan Association: very deep, moderately well drained, loamy soils, on nearly level to gently sloping valley bottoms,	Eastcan	0-5	VD	Loam, silt loam	L	L	Good	None
32.5-35	Etchen-Henoit Association: moderately deep and very deep, well drained, very gravelly and cobbly soils; on very steep mountains and canyon walls.	Etchen	30-60	MD	Cobbly and very cobbly sandy clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Henoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
35-38.5	Lucky Star-Charcol Association: very deep, well drained, very gravelly soils; on steep mountains.	Lucky Star	30-60	VD	Very gravelly or very cobbly loam and sandy loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Charcol	30-60	VD	Very gravelly or very cobbly loamy fine sand to clay loam	M-H	L	Poor: slope, gravels and cobbles	None

APPENDIX A   CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
38.5-48.5	Ridd-Rock Outcrop-Kilburn Association: moderately deep and very deep, loamy and very gravelly soils, and rock outcrop, on sloping to steep mountains, canyon walls, and associated fans and terraces on toeslopes.	Ridd	30-70	MD	Gravelly or very gravelly sand loam	H-VH	L	Poor: slope, gravels	None
		Rock Outcrop	-	-	-----	-	-	-----	--
		Kilburn	10-50	VD	Gravelly or cobbly sandy loam over very gravelly loamy sand	M-H	L	Fair to Poor: very gravelly substratum, slope	None
Basin and Range									
48.5-51	Chipman Association: very deep, poorly drained, loamy soils, on nearly level floodplains.	Chipman	0-3	VD	Silty clay loam	L	M	Good to Fair: sometimes saline/alkaline	Some
51-61	Decker-Lasil-Saltair Association: very deep, somewhat poorly and poorly drained, saline/alkaline, loamy soils; on nearly level lake plains.	Decker	0-2	VD	Stratified sandy loam to silty clay loam	L	M	Fair to Poor: saline/alkaline	None
		Lasil	0-2	VD	Silty clay loam	L	M	Poor: saline/alkaline	None
		Saltair	0-2	VD	Silty clay loam	L	L	Poor: saline/alkaline	None
61-79	Bingham-Hans Association: very deep, well drained, loamy and gravelly soils; on nearly level to sloping lake plains and fans.	Bingham	0-10	VD	Gravelly or cobbly loam and clay loam over very cobbly loamy sand	L	L	Fair: very cobbly and sandy substream	Some
		Hans	0-6	VD	Silty clay loam and silt loam	L	L	Good: none	Some
79-88	Dry Creek-Juab-Lodar Association: very deep and shallow, well drained, clayey, loamy and very gravelly soils; on gently sloping to steep fans, terraces, and hills.	Dry Creek	4-15	VD	Gravelly or cobbly clay	L-M	L	Fair: clay, gravels and cobbles	None
		Juab	0-8	VD	Loam, silt loam	L	M	Good: none	Some
		Lodar	10-50	S	Very gravelly to very stony loamy	M-VH	1	Poor: quantity, gravels, cobbles, and stones	None
88-89.5 100.5-103 125.5-128 130-132 141-142	Amtuft-Borvant-Reywat Association: shallow, well and somewhat excessively drained, very gravelly and cobbly soils; on sloping to steep hills and mountains.	Amtuft	8-60	S	Very cobbly and very gravelly loam and sandy loam	M-VH	L	Poor: quantity, gravels and cobbles, slope	None
		Borvant	8-60	S	Very gravelly loam over a hardpan	M-VH	L	Poor: quantity, gravels, and cobbles, slope	None
		Reywat	8-60	S	Very cobbly clay loam	M-VH	L	Poor: quantity, gravels and cobbles, slope	None

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
89.5-100.5 103-125.5 128-130 142-148.5	Genola-Linoyer-Donnardo Association: very deep, well drained, loamy and very cobbly soils; on nearly level to sloping fans and terraces.	Genola	0-10	VD	Silt loam	L-M	M	Good: none	None
		Linoyer	0-10	VD	Very fine sandy loam and silt loam	L-M	M	Good: none	None
		Donnardo	2-10	VD	Very cobbly loam or fine sandy loam	L	L	Poor: cobbles and gravel	None
132-141	Juab-Hansel Association: very deep, well drained, very deep, loamy soils; on nearly level to sloping fans and terraces.	Juab	0-8	VD	Loam or silt loam	L	M	Good: none	Some
		Hansel	0-8	VD	Silt loam	L	L	Good: none	Some
148.5-150	Mellor Association: very deep, somewhat poorly to well drained, saline/alkaline, loamy soils; on nearly level floodplains and low terraces.	Mellor	0-2	VD	Silt loam, fine sandy loam	L	M	Fair to Poor: saline/alkaline	None
150-154	Shabliss-Pober-Genola Association: shallow to very deep, well drained, loamy and very gravelly soils; on fans and lake terraces.	Shabliss	1-5	S	Loam, fine sandy loam over a hardpan	L	L	Poor: quantity	None
		Pober	2-30	MD	Very gravelly loam or sandy loam over a hardpan	L-H	M	Fair: gravels, quantity	None
		Genola	1-5	D	Silt loam, silty clay loam	L	M	Good	None
WASATCH VARIATION, PAGES LANE									
Middle Rocky Mountains									
0-5	Yeates Hollow-Manila-Henefer Association: deep and very deep, well drained, very gravelly and clayey soils; on moderately steep to steep mountains and valley sideslopes.	Yeates Hollow	15-60	D	Very gravelly or very cobbly clay loam and clay	M-H	L	Fair to Poor: gravels, cobbles, clayey texture, slope	None
		Manila	15-60	VD	Clay, clay loam	M-VH	L	Fair to Poor: clayey texture, slope	None
		Henefer	15-60	VD	Clay, clay loam, gravelly clay	M-VH	L	Fair to Poor: clayey texture, slope	None
5-14 16-23	Richsum-Cutoff Family-Vicking Association: moderately deep and deep, well drained, loamy and very gravelly soils; on sloping to to steep mountains and valley sideslopes.	Richsum	15-70	MD	Loam, clay loam	M-VH	L	Fair to Poor: quantity, slope	None
		Cutoff Family	15-70	D	Very gravelly sandy loam and loam	M-VH	L	Fair to Poor: slope	None
		Vicking	10-40	VD	Clay loam, loam	M-H	L	Fair to Poor: slope	Some

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
14-16	Sowcan-Pringle-Watkins Ridge Association: very deep, somewhat poorly to well drained, loamy and very gravelly soils; on nearly level to sloping bottomlands and alluvial fans.	Sowcan	0-5	VD	Loam, fine sandy loam over very gravelly sand	L	M	Fair: very gravelly sand substratum	Some
		Pringle	0-5	VD	Stratified loamy over sand and gravel	L	L	Fair: sand and gravel substratum	Some
		Watkins Ridge	0-10	VD	Loam, clay loam	L	M	Good	Some
23-26 30.5-32.5	Bertag-Donner-Yeates Hollow Association: deep and very deep, well drained, clayey and cobbly soils; on sloping to steep foothills and mountain footslopes.	Bertag	10-40	VD	Silty clay loam, clay loam, clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Donner	10-40	MD	Clay loam, silty clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Yeates Hollow	6-50	D	Cobbly and very cobbly clay loam and clay	L-H	L	Fair to Poor: cobbles, slope	None
26-29	Benoit-Kilfoil Association: very deep and moderately deep, well drained, very gravelly and loamy soils; on very steep mountain slopes and canyon walls.	Benoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels	None
		Kilfoil	40-60	MD	Clay loam, gravelly loam	H-VH	L	Poor: slope	None
29-30.5	Eastcan Association: very deep, moderately well drained, loamy soils, on nearly level to gently sloping valley bottoms,	Eastcan	0-5	VD	Loam, silt loam	L	L	Good	None
32.5-35	Etchen-Benoit Association: moderately deep and very deep, well drained, very gravelly and cobbly soils; on very steep mountains and canyon walls.	Etchen	30-60	MD	Cobbly and very cobbly sandy clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Benoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
35-38.5	Lucky Star-Charcol Association: very deep, well drained, very gravelly soils; on steep mountains.	Lucky Star	30-60	VD	Very gravelly or very cobbly loam and sandy loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Charcol	30-60	VD	Very gravelly or very cobbly loamy fine sand to clay loam	M-H	L	Poor: slope, gravels and cobbles	None

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
14-16	**Sowcan-Pringle-Watkins Ridge Association**: very deep, somewhat poorly to well drained, loamy and very gravelly soils; on nearly level to sloping bottomlands and alluvial fans.	Sowcan	0-5	VD	Loam, fine sandy loam over very gravelly sand	L	M	Fair: very gravelly sand substratum	Some
		Pringle	0-5	VD	Stratified loamy over sand and gravel	L	L	Fair: sand and gravel substratum	Some
		Watkins Ridge	0-10	VD	Loam, clay loam	L	M	Good	Some
23-26 30.5-32.5	**Bertag-Donner-Yeates Hollow Association**: deep and very deep, well drained, clayey and cobbly soils; on sloping to steep foothills and mountain footslopes.	Bertag	10-40	VD	Silty clay loam, clay loam, clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Donner	10-40	MD	Clay loam, silty clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Yeates Hollow	6-50	D	Cobbly and very cobbly clay loam and clay	L-H	L	Fair to Poor: cobbles, slope	None
26-29	**Henoit-Kilfoil Association**: very deep and moderately deep, well drained, very gravelly and loamy soils; on very steep mountain slopes and canyon walls.	Henoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels	None
		Kilfoil	40-60	MD	Clay loam, gravelly loam	H-VH	L	Poor: slope	None
29-30.5	**Eastcan Association**: very deep, moderately well drained, loamy soils, on nearly level to gently sloping valley bottoms,	Eastcan	0-5	VD	Loam, silt loam	L	L	Good	None
32.5-35	**Etchen-Henoit Association**: moderately deep and very deep, well drained, very gravelly and cobbly soils; on very steep mountains and canyon walls.	Etchen	30-60	MD	Cobbly and very cobbly sandy clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Henoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
35-38.5	**Lucky Star-Charcol Association**: very deep, well drained, very gravelly soils; on steep mountains.	Lucky Star	30-60	VD	Very gravelly or very cobbly loam and sandy loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Charcol	30-60	VD	Very gravelly or very cobbly loamy fine sand to clay loam	M-H	L	Poor: slope, gravels and cobbles	None

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
80.5-89.5	Dry Creek-Juab-Lodar Association: very deep and shallow, well drained, clayey, loamy and very gravelly soils; on gently sloping to steep fans, terraces, and hills.	Dry Creek	4-15	VD	Gravelly or cobbly clay	L-M	L	Fair: clay, gravels and cobbles	None
		Juab	0-8	VD	Loam, silt loam	L	M	Good: none	Some
		Lodar	10-50	S	Very gravelly to very stony loamy	M-VH	L	Poor: quantity, gravels, cobbles, and stones	None
89.5-91.0 102-104.5 127-129.5 131.5-133.5 142.5-143.5	Amtuft-Borvant-Reywat Association: shallow, well and somewhat excessively drained, very gravelly and cobbly soils; on sloping to steep hills and mountains.	Amtuft	8-60	S	Very cobbly and very gravelly loam and sandy loam	M-VH	L	Poor: quantity, gravels and cobbles, slope	None
		Borvant	8-60	S	Very gravelly loam over a hardpan	M-VH	L	Poor: quantity, gravels, and cobbles, slope	None
		Reywat	8-60	S	Very cobbly clay loam	M-VH	L	Poor: quantity, gravels and cobbles, slope	None
91-102 104.5-127 129.5-131.5 143.5-150	Genola-Linoyer-Donnardo Association: very deep, well drained, loamy and very cobbly soils; on nearly level to sloping fans and terraces.	Genola	0-10	VD	Silt loam	L-M	M	Good: none	None
		Linoyer	0-10	VD	Very fine sandy loam and silt loam	L-M	M	Good: none	None
		Donnardo	2-10	VD	Very cobbly loam or fine sandy loam	L	L	Poor: cobbles and gravel	None
133.5-142.5	Juab-Hansel Association: very deep, well drained, very deep, loamy soils; on nearly level to sloping fans and terraces.	Juab	0-8	VD	Loam or silt loam	L	M	Good: none	Some
		Hansel	0-8	VD	Silt loam	L	L	Good: none	Some
150-151.5	Mellor Association: very deep, somewhat poorly to well drained, saline/alkaline, loamy soils; on nearly level floodplains and low terraces.	Mellor	0-2	VD	Silt loam, fine sandy loam	L	M	Fair to Poor: saline/alkaline	None
151.5-155.5	Shabliss-Pober-Genola Association: shallow to very deep, well drained, loamy and very gravelly soils; on fans and lake terraces.	Shabliss	1-5	S	Loam, fine sandy loam over a hardpan	L	L	Poor: quantity	None
		Pober	2-30	MD	Very gravelly loam or sandy loam over a hardpan	L-H	M	Fair: gravels, quantity	None
		Genola	1-5	D	Silt loam, silty clay loam	L	M	Good	None

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Milepost	Soil Mapping Unit	Soil Series	Slope (%)^a	Depth Class^f	Texture^b	Erosion Potential		Reclamation Potential Limitations^e	Cropland
						Water^c	Wind^d		
WASATCH VARIATION, BOUNTIFUL PEAK									
Middle Rocky Mountains									
0-5	Yeates Hollow-Manila-Henefer Association: deep and very deep, well drained, very gravelly and clayey soils; on moderately steep to steep mountains and valley sideslopes.	Yeates Hollow	15-60	D	Very gravelly or very cobbly clay loam and clay	M-H	L	Fair to Poor: gravels, cobbles, clayey texture, slope	None
		Manila	15-60	VD	Clay, clay loam	M-VH	L	Fair to Poor: clayey texture, slope	None
		Henefer	15-60	VD	Clay, clay loam, gravelly clay	M-VH	L	Fair to Poor: clayey texture, slope	None
5-14 16-23	Richsum-Cutoff Family-Vicking Association: moderately deep and deep, well drained, loamy and very gravelly soils; on sloping to to steep mountains and valley sideslopes.	Richsum	15-70	MD	Loam, clay loam	M-VH	L	Fair to Poor: quantity, slope	None
		Cutoff Family	15-70	D	Very gravelly sandy loam and loam	M-VH	L	Fair to Poor: slope	None
		Vicking	10-40	VD	Clay loam, loam	M-H	L	Fair to Poor: slope	Some
14-16	Sowcan-Pringle-Watkins Ridge Association: very deep, somewhat poorly to well drained, loamy and very gravelly soils; on nearly level to sloping bottomlands and alluvial fans.	Sowcan	0-5	VD	Loam, fine sandy loam over very gravelly sand	L	M	Fair: very gravelly sand substratum	Some
		Pringle	0-5	VD	Stratified loamy over sand and gravel	L	L	Fair: sand and gravel substratum	Some
		Watkins Ridge	0-10	VD	Loam, clay loam	L	M	Good	Some
23-26 30.5-32.5	Bertag-Donner-Yeates Hollow Association: deep and very deep, well drained, clayey and cobbly soils; on sloping to steep foothills and mountain footslopes.	Bertag	10-40	VD	Silty clay loam, clay loam, clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Donner	10-40	MD	Clay loam, silty clay	M-H	L	Fair to Poor: clayey texture, slope	None
		Yeates Hollow	6-50	D	Cobbly and very cobbly clay loam and clay	L-H	L	Fair to Poor: cobbles, slope	None
26-29	Benoit-Kilfoil Association: very deep and moderately deep, well drained, very gravelly and loamy soils; on very steep mountain slopes and canyon walls.	Benoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels	None
		Kilfoil	40-60	MD	Clay loam, gravelly loam	H-VH	L	Poor: slope	None
29-30.5	Eastcan Association: very deep, moderately well drained, loamy soils, on nearly level to gently sloping valley bottoms.	Eastcan	0-5	VD	Loam, silt loam	L	L	Good	None

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
32.5-35	Etchen-Henoit Association: moderately deep and very deep, well drained, very gravelly and cobbly soils; on very steep mountains and canyon walls.	Etchen	30-60	MD	Cobbly and very cobbly sandy clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Henoit	30-60	VD	Very gravelly clay loam	H-VH	L	Poor: slope, gravels and cobbles	None
35-38.5	Lucky Star-Charcol Association: very deep, well drained, very gravelly soils; on steep mountains.	Lucky Star	30-60	VD	Very gravelly or very cobbly loam and sandy loam	H-VH	L	Poor: slope, gravels and cobbles	None
		Charcol	30-60	VD	Very gravelly or very cobbly loamy fine sand to clay loam	M-H	L	Poor: slope, gravels and cobbles	None
38.5-44.5	Nagitsy - Rock Outcrop - Poleline Association: moderately deep and deep well drained, very gravelly soils, and rock outcrop; on steep mountain sides	Nagitsy	30-70	MD	stony loam over very gravelly loam	H-VH	L	Poor: slope, gravels	None
		Rock Outcrop	-	-	----	-	-	----	--
		Poleline	30-70	D	stony loam over very gravelly loam	H-VH	L	Poor: slope, gravels	None
44.5-48.0	Ridd-Rock Outcrop-Kilburn Association: moderately deep and very deep, loamy and very gravelly soils, and rock outcrop, on sloping to steep mountains, canyon walls, and associated fans and terraces on toeslopes.	Ridd	30-70	MD	Gravelly or very gravelly sand loam	H-VH	L	Poor: slope, gravels	None
		Rock Out-crop	-	-	----	-	-	----	--
		Kilburn	10-50	VD	Gravelly or cobbly sandy loam over very gravelly loamy sand	M-H	L	Fair to Poor: very gravelly substratum, slope	None
Basin and Range									
48-53	Ironton-Logan-Draper Association: very deep, moderately well to very poorly drained, loamy soils; on flood plains and terraces.	Ironton	0-6	VD	Silt loam, loam	L	M	Good	Some
		Logan	0-3	VD	silty clay loam, silt loam	L	L	Good to Fair: sometimes saline/alkaline	Some
		Draper	0-6	VD	loam	L	L	Good	Some
53-56	Leland-Payson-Warm Springs Association: very deep, somewhat poorly and moderately well drained, saline-alkal; loamy soils; on low terraces.	Leland	0-3	VD	Silt loam, clay loam, very fine sandy loam	L	M	Fair to Poor: saline/alkaline	Some
		Payson	0-3	VD	Silt loam, silty clay loam, clay	L	L	Fair to Poor: Saline/alkaline	Some
		Warm Springs	0-3	VD	fine sandy loam over loamy fine sand	L	M	Fair to Poor: Saline/alkaline	Some

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE NYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
56-56.5	Chipman Association: very deep, poorly drained, loamy soils, on nearly level floodplains.	Chipman	0-3	VD	Silty clay loam	L	M	Good to Fair: sometimes saline/alkaline	Some
56.5-68	Decker-Lasil-Saltair Association: very deep, somewhat poorly and poorly drained, saline/alkaline, loamy soils; on nearly level lake plains.	Decker	0-2	VD	Stratified sandy loam to silty clay loam	L	M	Fair to Poor: saline/alkaline	None
		Lasil	0-2	VD	Silty clay loam	L	M	Poor: saline/alkaline	None
		Saltair	0-2	VD	Silty clay loam	L	L	Poor: saline/alkaline	None
68-86	Bingham-Hans Association: very deep, well drained, loamy and gravelly soils; on nearly level to sloping lake plains and fans.	Bingham	0-10	VD	Gravelly or cobbly loam and clay loam over very cobbly loamy sand	L	L	Fair: very cobbly and sandy substream	Some
		Hans	0-6	VD	Silty clay loam and silt loam	L	L	Good: none	Some
86-95	Dry Creek-Juab-Lodar Association: very deep and shallow, well drained, clayey, loamy and very gravelly soils; on gently sloping to steep fans, terraces, and hills.	Dry Creek	4-15	VD	Gravelly or cobbly clay	L-M	L	Fair: clay, gravels and cobbles	None
		Juab	0-8	VD	Loam, silt loam	L	M	Good: none	Some
		Lodar	10-50	S	Very gravelly to very stony loamy	M-VH	l	Poor: quantity, gravels, cobbles, and stones	None
95-96.5 107.5-110 132.5-135 137-139 148-149	Amtuft-Borvant-Reywat Association: shallow, well and somewhat excessively drained, very gravelly and cobbly soils; on sloping to steep hills and mountains.	Amtuft	8-60	S	Very cobbly and very gravelly loam and sandy loam	M-VH	L	Poor: quantity, gravels and cobbles, slope	None
		Borvant	8-60	S	Very gravelly loam over a hardpan	M-VH	L	Poor: quantity, gravels, and cobbles, slope	None
		Reywat	8-60	S	Very cobbly clay loam	M-VH	L	Poor: quantity, gravels and cobbles, slope	None
96.5-107.5 110-132.5 135-137 149-155.5	Genola-Linoyer-Donnardo Association: very deep, well drained, loamy and very cobbly soils; on nearly level to sloping fans and terraces.	Genola	0-10	VD	Silt loam	L-M	M	Good: none	None
		Linoyer	0-10	VD	Very fine sandy loam and silt loam	L-M	M	Good: none	None
		Donnardo	2-10	VD	Very cobbly loam or fine sandy loam	L	L	Poor: cobbles and gravel	None
139-148	Juab-Hansel Association: very deep, well drained, very deep, loamy soils; on nearly level to sloping fans and terraces.	Juab	0-8	VD	Loam or silt loam	L	M	Good: none	Some
		Hansel	0-8	VD	Silt loam	L	L	Good: none	Some

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE MICAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)^a	Depth Class^f	Texture^b	Erosion Potential		Reclamation Potential Limitations^e	Cropland
						Water^c	Wind^d		
155.5-157	Mellor Association: very deep, somewhat poorly to well drained, saline/alkaline, loamy soils; on nearly level floodplains and low terraces.	Mellor	0-2	VD	Silt loam, fine sandy loam	L	M	Fair to Poor: saline/ alkaline	None
157-161	Shabliss-Pober-Genola Association: shallow to very deep, well drained, loamy and very gravelly soils; on fans and lake terraces.	Shabliss	1-5	S	Loam, fine sandy loam over a hardpan	L	L	Poor: quantity	None
		Pober	2-30	MD	Very gravelly loam or sandy loam over a hardpan	L-H	M	Fair: gravels, quantity	None
		Genola	1-5	D	Silt loam, silty clay loam	L	M	Good	None
NORTH LAS VEGAS VARIATION									
Mojave Desert									
0-4.5	Mormon Mesa-Flattop-Arada Association: shallow and very deep, well and somewhat excessively drained, loamy and very gravelly soils; on nearly level to sloping fans and terraces.	Mormon Mesa	0-8	S	Fine sandy loam	L	H	Poor: quantity	None
		Flattop	2-8	MD	Gravelly and very gravelly fine sandy loam over a hardpan	L	L	Fair: quantity, gravels	None
		Arada	0-8	VD	Sand, very gravelly loamy sand	L	H	Poor: sandy texture	--
4.5-8	Badland-Bard-Tonapah Association: shallow to deep, well and somewhat excessively drained, loamy and very gravelly soils, and badland; on dissected terraces and fans.	Badland	15-50	-	----	-	-	----	--
		Bard	2-15	S	Fine sandy loam over a hardpan	L-M	M	Poor: quantity	None
		Tonapah	2-15	VD	Very gravelly sand	L	L	Poor: gravel and sand	None
8-9.2 12-12.5	Gila-Toquop-Virgin River Association: very deep, somewhat poorly to excessively drained, saline/alkaline, loamy and sandy soils; on bottomlands and low terraces.	Gila	0-2	VD	Silt loam to fine sandy loam	L	L	Fair to Poor: saline/ alkaline	None
		Toquop	0-2	VD	Fine sand	L	H	Poor: sandy texture	None
		Virgin River	0-2	VD	Stratified clay to sand	L	M	Fair to Poor: saline/ alkaline	Some

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE NYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
9.2-12 12.5-42	Bard-Colorock-Tonapah Association: shallow and deep, well and somewhat excessively drained, loamy and very gravelly soils; on fans and terraces.	Bard	2-15	S	Fine sandy loam over a hardpan	L-M	M	Poor: quantity	None
		Colororck	2-15	S	Very gravelly sandy loam over a hardpan	L-M	L	Poor: quantity	None
		Tonapah	2-15	VD	Very gravelly sand	L	L	Poor: gravel and sand	None
42-43.5 75-77.5 87-88	Rockland-St. Thomas Association: shallow, well drained, very cobbly soils and rockland, on sloping to steep foothills and mountains.	Rockland	-	-	-----	-	-	-----	--
		St. Thomas	10-50	S	Very cobbly loam	M-H	L	Poor: quantity, slope	None
43.5-53 60-66 67-68	Weiser-Dalain Association: very deep, well drained, extremely gravelly soils; on gently sloping to sloping fans.	Weiser	2-8	VD	Extremely gravelly fine sandy loam	L	L	Poor: gravels	None
		Dalain	0-8	VD	Extremely gravelly fine sandy loam	L	L	Poor: gravels	None
53-60 66-67 68-72 73-75 77.5-87	Cave-Las Vegas-Goodsprings Association: shallow, well drained, gravelly and loamy soils; on nearly level to strongly sloping fan remnants.	Cave	0-15	S	Gravelly sandy loam over a hardpan	L-M	M	Poor: quantity	None
		Las Vegas	0-15	S	Fine sandy loam, sandy clay loam over a hardpan	L-M	M	Poor: quantity	None
		Goodsprings	0-15	S	Gravelly fine sandy loam over a hardpan	L-M	M	Poor: quantity	None
72-73	Jean-Arizo Association: very deep, excessively drained, very gravelly soils; on gently sloping to sloping alluvial fans and channels.	Jean	0-4	VD	Very gravelly loamy sand	L	L	Poor: gravels and sand	None
		Arizo	0-8	VD	Very gravelly loamy sand	L	L	Poor: gravels and sand	None
88-119.5	Goodsprings and Ivanpah Valleys: very deep and shallow, well and somewhat excessively drained, very gravelly sandy and loamy soils; on nearly level to moderately steep fans and terraces	Nickel	2-15	VD	Very gravelly sandy loam	L	L	Fair: gravels	None
		Arizo	0-15	VD	Very gravelly loamy sand	L	L	Poor: gravels and sand	None
		Cajon	0-5	VD	Gravelly loamy sand	L	H	Poor: sandy texture	None
		Cave	0-15	S	Gravelly sandy loam over a hardpan	L-M	M	Poor: quantity	None
		Grapevine	0-5	VD	Sandy loam, gravelly sand	L	M	Good to Fair: saline/alkaline	None

APPENDIX A CHARACTERISTICS OF THE SOIL MAPPING UNITS THAT WOULD BE TRAVERSED BY THE WYCAL PROPOSAL

Milepost	Soil Mapping Unit	Soil Series	Slope (%)[a]	Depth Class[f]	Texture[b]	Erosion Potential Water[c]	Erosion Potential Wind[d]	Reclamation Potential Limitations[e]	Cropland
119.5-120.5	Rock Outcrop-Calvista-Aftaden Association: rock outcrop and shallow, well drained, gravelly and cobbly loamy soils; on mountains	Rock Outcrop	-	-	----	-	-	----	--
		Calvista	30-50	S	Cobbly sandy loam, sandy loam	H	M	Poor: quantity	None
		Afftaden	15-30	S	Gravelly sandy, clay loam	M-H	M	Poor: quantity	None
120.5-127 137-149	Nickel-Arizo-Bermesia Association: very deep and moderately deep, well drained, very gravelly soils; on alluvial fans	Nickel	4-15	VD	Very gravelly sandy loam	L	L	Fair: gravels	None
		Arizo	4-15	VD	Very gravelly loamy sand	L	L	Poor: gravels and sand	None
		Bermesia	4-8	MD	Very gravelly clay loam over a hardpan	L	M	Fair: gravels, quantity	None
127-130 132.5-137	Canutio-Bitter Springs-Bermesia Association: very deep and moderately deep, well drained, very gravelly soils; on dissected alluvial fans	Canutio	15-30	VD	Very gravelly loam or sandy loam	M-H	M	Fair: gravels	None
		Bitter Spr	4-8	VD	Very gravelly sandy loam	L	M	Fair: gravels	None
		Bermesia	4-8	MD	Very gravelly clay loam	L	M	Fair: gravels, quantity	None
130-132.5	Newkirk-Caralampi-Rock Outcrop Association: shallow and moderately deep, well drained, gravelly and very gravelly soils and rock outcrop; on lower mountain slopes	Newkirk	15-30	S	Gravelly sandy clay loam	M-H	M	Poor: quantity	None
		Caralampi	4-15	MD	Very gravelly sandy clay loam	L	L	Fair: quantity, gravels	None
		Rock Outcrop	-	-	----	-	-	----	--
149-151	McCullough-Cajon-Whitlock Association: very deep, well drained, loamy and sandy soils; on alluvial fans	McCullough	0-4	VD	Sandy loam over loamy sand	L	M	Fair: sandy texture	None
		Cajon	2-4	VD	Loamy sand	L	H	Poor: sandy texture	None
		Whitlock	2-4	VD	Sandy loam over sandy clay loam	L	M	Good	None

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[a] Slope range for soil series, pipeline may be on gentler portions of slope range.

[b] Typical textures in soil profile

[c] L(low) = < 5 tons/acre/year; M(moderate) = 5-20 tons/acre/year; H(high) = 20-50 tons/acre/year; VH(very high) = > 50 tons/acre/year

[d] Based on WEG (Wind Erodibility classes): L(low) = 5-8; M(moderate) = 2-4; H(high) = 1-2; or Soil Conservation interpretations based on soil mapping unit descriptions.

[e] Based on trenching with no selective soil handling or mitigation.

[f] Soil depth classes: VS 0-10 inches S 10-20 inches MD 20-40 inches
D 40-60 inches VD 60+ inches

APPENDIX B

PLANT SPECIES OF SPECIAL CONCERN

APPENDIX B PLANT SPECIES OF SPECIAL CONCERN WHICH MAY OCCUR ALONG THE WYCAL MAINLINE IN WYOMING, ASSOCIATED COMPONENTS, AND VARIATIONS

Project Component	Geographic Region	Common Name	Scientific Name	Status[ab]	Community Type	Habitat/ Flowering Time	Milepost Potential Habitat
WyCal Mainline Northern Leg	Wyoming Basin	Locoweed	*Astragalus jejunus* ssp. nov./ined	C2	No data	May occur on plains and hills in southwest Wyoming; No specific information.	0-38
North Las Vegas Variation	Mojave Desert	Desert poppy	*Arctomecon californicum*	C2	Mojavean creosote bush scrub	Barren, gravelly desert flats, hummocks, and slopes; on tuffaceous sedimentary rocks; often in soil heavily impregnated with gypsum. 1,310-2,760 feet elevation. April/May	0-151
		Merriam's poppy	*Arctomecon merriamii*	C3	Mojavean creosote bush scrub, Saltbush scrub	Occurring on limestone and clay alluvials or other areas where limestone substrate occurs at the surface; not present in sandy soils or areas with desert pavement; 1,000-5,000 feet elevation. April/May	0-151
		Milk vetch	*Astragalus geyeri* var. *triguetrus*	C2	Mojavean creosote bush scrub	Sandy places in flats, dunes, washes and gullies; 1,500-2,500 feet elevation; an annual species of unpredictable distribution--it may appear only in favorable years. April/May	0-151
		Catseye	*Cryptantha insolita*	C2*	Mojavean creosote bush scrub, Saltbush scrub	Not definitely known; believed from quaternary alluvium perhaps on saline clay soil with gypsum outcrops. April/June	0-151
		Beardtongue	*Penstemon bicolor* ssp. *roseus*	C2	Mojavean creosote bush scrub	Sandy, gravelly washes. May/June	0-151
		Wild buckwheat	*Eriogonum viscidulum*	C2 NE	Mojavean creosote bush scrub	Sandy soil in washes and flats, an annual whose appearance is sporadic depending on rainfall.	0-151

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[a] Federal candidates and federally listed plants:
C2 = Threat and/or distribution data are insufficient to support federal listing
C2* = Threat and/or distribution data are insufficient to support federal listing; plant presumed extinct
C3a = Extinct
C3b = Taxonomically invalid
C3c = Too widespread and/or not threatened

[b] State listed plants:
NE = Nevada state listed, endangered

APPENDIX C

A SUMMARY OF LIVESTOCK GRAZING ALLOTMENTS AFFECTED BY THE WYCAL PIPELINE PROPOSAL AND VARIATIONS

APPENDIX C A SUMMARY OF LIVESTOCK GRAZING ALLOTMENTS AFFECTED BY THE WYCAL PROPOSAL AND VARIATIONS

		GRAZING ALLOTMENTS							PIPELINE						
State	Administration Agency[1]	Allotment	I.D. Number	Total Acres[2]	Type[3] Animal	Range	AUMS	AC/AUM	Milepost Start	End	Miles Affected	Acres Affected[4]	AUMS Affected	Percent Allotment Affected	Source
Mainline Northern Leg															
Wyoming	BLM	Slate Creek	1113	271,170	S,C	P	12,293	22.1	0.0	0.8	0.8	9.6	0.4	<.1	Kemmerer Resource Management Plan-BLM
		Roberson Creek	1325	5,796	C	P	130	44.6	1.4	3.1	1.7	20.4	0.5	.4	" " " " " " " " "
		Carter Lease	1306	257,313	S,C	P	30,798	8.4	3.1 5.9	4.8 14.5	10.3	123.6	14.7	<.1	" " " " " " " " "
		Coyote Springs	1304	8,062	C	P	473	17.0	4.8	5.9	1.1	13.2	0.8	.2	" " " " " " " " "
		Cumberland	1206	459,302	S,C,H	P	66,690	6.9	14.5	43.3	28.8	345.6	50.1	.1	" " " " " " " " "
		Medicine Butte	1501	16,803	C	P	912	18.4	43.3	44.3	1.0	12.0	0.7	.1	" " " " " " " " "
		Rock House	1503	13,195	C	P	1,670	7.9	44.3	47.8	3.5	42.0	5.3	.3	" " " " " " " " "
		Valley Creek	1506	5,134	C	P	256	20.1	47.8	49.9	2.1	25.2	1.3	.5	" " " " " " " " "
		Heinsaw Creek	1507	39,791	S,C	P	1,114	35.7	49.9	52.8	2.9	34.8	1.0	.1	" " " " " " " " "
		Spring Hollow	1509	8,291	S,C	P	228	36.4	52.8	54.0	1.2	14.4	0.4	.2	" " " " " " " " "
		Blake Hollow	1525	6,926	S	P	255	27.2	54	57	3.0	36	1.3	.5	" " " " " " " " "
Wasatch Variation Alternatives: Bountiful Peak, Page Lane, Bountiful Boulevard															
Utah	USFS	Arthur Fork	-	3,800	S	P	480	7.9	Boundary		2	24	3.0	<.1	Jim Cook per communication
	Wasatch	Shingle Mill	-	1,000	S	P	51	19.6	Boundary		2	24	1.2	.1	" " " " " " " " " " " "
		Mill Canyon	-	2,600	S	P	60	43.3	116A	117A	1	12	0.3	<.1	" " " " " " " " " " " "
North Las Vegas Variation															
Nevada	BLM	Jean Lake	-	137,217	C	E,P	3,529	38.9	112	125	13	156	4.0	<.1	Clark County Grazing EIS
		Upper Mormon Mesa	-	47,659	C	E,P	779	61.2	0	4	4	48	.8	<.1	" " " " " " " " " " " "
		Glendale	-	22,353	C	E	*None	-	4	9	5	60	-	-	" " " " " " " " " " " "
		Ute	-	90,280	C	E	107	656.8	9	12	3	36	<.1	<.1	" " " " " " " " " " " "
		Dry Lake	-	69,399	C	E	199	348.7	28	45	17	204	.6	<.1	" " " " " " " " " " " "
		Spring Mountain	-	310,364	-	-	**None	-	74	92	18	216	-	-	" " " " " " " " " " " "
		Table Mountain	-	92,269	C	E,P	174	530.3	92	102	10	120	.2	<.1	" " " " " " " " " " " "
		Roach Lake	-	14,986	C	E,P	292	51.3	102	112	10	120	2.3	<.1	" " " " " " " " " " " "
		Las Vegas Valley	-	62,243	-	-	-	-	45	74	29	348	-	-	" " " " " " " " " " " "
		Crescent Peak	-	119,320	C	E	-	-	125	156	31	372	-	-	" " " " " " " " " " " "

---

[1] PVT = private land; BLM = Bureau of Land Management; BIA = Bureau of Indian Affairs; State = State lands; Public = Public lands.
[2] NI = Information not readily available.
[3] C = cow; S = sheep; H = horse; G = goat; E = ephemeral range; P = permanent range.
[4] Assuming 12 acres to the linear mile.
* Private and State land not included.

MOJAVE-KERN RIVER-EL DORADO
NATURAL GAS PIPELINE PROJECTS

FINAL SUPPLEMENT TO THE
FINAL ENVIRONMENTAL IMPACT
REPORT/STATEMENT

WYCAL SUPPLEMENT

Comparisons and Recommendations

VOLUME III SUPPLEMENT

California State Lands Commission
1307 18th Street
Sacramento, California 95814

and

Federal Energy Regulatory Commission
825 N. Capitol St., NE
Washington, D.C. 20426

October, 1988

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1.0 INTERSTATE SYSTEMS COMPARATIVE ANALYSES

1.1 INTRODUCTION

This document will compare all significant and some insignificant impacts which would be created by the three major proposals. Each proposal and its alternatives/variations will be compared to determine the best case for each of the three major proposals. Once this has been done, comparisons among the best cases will be completed. This represents a reevaluation of the Mojave and Kern River data, as well as the inclusion of the new data presented in Volume VI which examined the WyCal information.

1.2 MOJAVE PROPOSED ACTION

The Mojave Pipeline Company proposes to construct an interstate natural gas pipeline from Mohave County, Arizona, to Kern County, California. The proposed Mojave system would be approximately 383 miles long. Three components make up the Mojave system: the Mojave Transfer Line in Mohave County would entail approximately 16.5 miles of new pipeline; the proposed mainline would consist of 322.5 miles of pipe; and the Kern Lateral would include 44 miles of pipeline in the San Joaquin Valley. Table 1.2-1 compares impacts of the Mojave Proposal and its alternatives.

In order to transport natural gas to the EOR fields in the Bakersfield area, the Mojave Pipeline Company must be supplied gas from other pipelines. Two natural gas transmission companies have proposed to supply this gas to Mojave. The El Paso Natural Gas Company and the Transwestern Pipeline Company would supply the 600 MMcfd of natural gas required to meet the needs of the Mojave proposal. Utilization of these companies resulted in four major ways of delivering natural gas to the EOR market. These four systems and alternatives to these systems will be outlined below with a discussion of the major impacts for each.

Systems B and D were included primarily to provide reasonable estimates of facility requirements to supply additional Rocky Mountain gas to Mojave instead of Kern River. No attempt was made to include the potential facilities needed for the 350 MMcfd Kern River proposed to receive from this area since the Mojave sponsors and others have taken the position that some Rocky Mountain gas could be made available to Mojave through other existing systems. Moreover, use of Rocky Mountain gas does not appear to be a requirement for the EOR market. Those interested in the facility requirements that Northwest might need to transport 350 MMcfd or even 700 MMcfd to the Mojave System, in spite of the above discussion, may refer to FEIR/S, II/2.7.2.4 and 2.7.6.

Table 1.2-1

MOJAVE SUMMARY OF IMPACTS

	MOJAVE SYSTEM				MOJAVE 1/ ROUTE		
	System A 2/	System B 3/	System C 4/	System D 5/	Mojave	Alternative A	Alternative B
AIR QUALITY	NSI 6/	NSI	NSI	NSI	NSI	NSI	NSI
GEOLOGY							
Surface fault rupture	18	19	16	17	16	0 (0)	5 (5)
Miles of landslide potential	27	43	80	179	0	0 (0)	0 (0)
Miles of slope greater than 30%	69	74	44	69	25	0 (0)	2 (1)
SOIL							
Acres of poor reclamation potential	4768	4914	3477	4057	2721	230 (162)	770 (764)
SURFACE WATER							
Number of stream crossings	74	78	67	126	34	3 (3)	2 (1)
Intermittent stream crossings	71	75	64	111	31	3 (3)	1 (0)
Perennial stream crossings	3	3	3	15	3	0 (0)	1 (1)
Moderate/high significance perennial stream crossings	0	0	0	9	0	0 (0)	0 (0)
GROUNDWATER							
Miles of potential impact	30	30	22	22	22	0 (0)	15 (20)
FRESHWATER BIOLOGY							
Number of sensitive stream crossings with fish present	0	0	0	0	0	0 (0)	0 (0)
TERRESTRIAL BIOLOGY							
Vegetation							
Total acres of native vegetation temporarily disturbed	8465	8465	6563	8470	3953	280 (206)	908 (910)
Acres of woody vegetation kept cleared for the life of the project	1765	1765	1774	1774	1535	136 (103)	435 (435)
Acres of riparian habitat crossed	61	61	61	71	59	10 (1)	7 (8)

Table 1.2-1 (continued)

MOJAVE SUMMARY OF IMPACTS

	MOJAVE SYSTEM				MOJAVE 1/ ROUTE		
	System A 2/	System B 3/	System C 4/	System D 5/	Mojave	Alternative A	Alternative B
Vegetation (continued)							
Acres of federally threatened or endangered plant habitat affected	60	60	0	75	0	0 (0)	0 (0)
Number of species	1	1	0	2	0	0 (0)	0 (0)
Acres of California state listed plant habitat affected	947	947	947	947	947	0 (0)	12 (12)
Number of species	3	3	3	3	3	0 (0)	1 (1)
Acres of agricultural land temporarily disturbed	767	767	731	915	731	0 (0)	45 (45)
Wildlife							
Big game crucial or high priority habitat (acres)	748	748	564	1553	85	0 (0)	0 (0)
Big game migration corridors (acres)	121	121	121	121	121	0 (0)	0 (0)
Big game fawning/calving area (acres)	56	56	0	0	0	0 (0)	0 (0)
Upland game bird sensitive habitat (acres)	0	0	24	30	0	0 (0)	0 (0)
Waterfowl critical nesting areas (acres)	0	0	0	0	0	0 (0)	0 (0)
Raptor nesting areas (nests)	0	0	0	2	0	0 (0)	0 (0)
Acres of potential threatened or endangered animal habitat	9615	9915	9419	10337	7822	633 (502)	1284 (1236)
Yuma clapper rail	151	151	36	36	127	121 (103)	0 (0)
Bald eagle	187	187	72	84	163	121 (103)	0 (0)
Peregrine falcon	490	490	60	60	163	121 (103)	0 (0)

Table 1.2-1 (continued)

MOJAVE SUMMARY OF IMPACTS

	MOJAVE SYSTEM				MOJAVE 1/ ROUTE		
	System A 2/	System B 3/	System C 4/	System D 5/	Mojave	Alternative A	Alternative B
Wildlife (continued)							
Whooping crane	0	0	0	0	0	0 (0)	0 (0)
California condor	1355	1355	1355	1355	1355	0 (0)	0 (0)
Desert tortoise	3032	3032	3274	3274	2959	270 (193)	921 (921)
Blunt-nosed leopard lizard	517	517	517	517	517	0 (0)	0 (0)
Tehachapi slender salamander	18	18	18	18	18	0 (0)	0 (0)
San Joaquin kit fox	647	647	647	647	647	0 (0)	0 (0)
Black-footed ferret	1345	1645	1567	2473	0	0 (0)	0 (0)
Mohave ground squirrel	727	727	727	727	727	0 (0)	363 (315)
Nelson's antelope squirrel	412	412	412	412	412	0 (0)	0 (0)
Tipton kangaroo rat	24	24	24	24	24	0 (0)	0 (0)
Short-nosed kangaroo rat	410	410	410	410	410	0 (0)	0 (0)
Giant kangaroo rat	300	300	300	300	300	0 (0)	0 (0)
SOCIOECONOMICS							
Population change >10%	No	No	No	No	No	No	No
Total employment change >10%	No	No	No	No	No	No	No
Income change >10%	No	No	No	No	No	No	No
Vacancy rates of temporary housing <5%	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local tax base change >10%	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 1.2-1 (continued)

MOJAVE SUMMARY OF IMPACTS

	MOJAVE SYSTEM				MOJAVE 1/ ROUTE		
	System A 2/	System B 3/	System C 4/	System D 5/	Mojave	Alternative A	Alternative B
Traffic	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Operational noise	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Recreation (conflicts)	5	5	4	5	5	0 (1)	0 (0)
LAND USE/OWNERSHIP							
Number of conflicts	9	9	6	8	8	0 (3)	0 (1)
CULTURAL RESOURCES							
Number of sites in the direct impact zone	82	90	91	226	41	0 (0)	8 (11)
NRHP listed or eligible sites in the direct impact zone	2	2	2	6	2	0 (0)	0 (0)
Percentage of line actually surveyed	6	6	8	18	6	0 (22)	15 (1)
High sensitivity segments	8	9	8	13	3	0 (0)	2 (1)
PALEONTOLOGIC RESOURCES							
Acres of impact to significant formations	3205	3263	2724	3580	1941	0 (0)	640 (793)
VISUAL RESOURCES							
Acres of high visual impact	0	0	0	0	0	0 (0)	0 (0)

1/ The first entry for each resource area under alternative routing represents the value for the alternative segment only; the value in parenthesis represents the comparable quanity for the portion of the proposed route which would be avoided by using this alternative.

2/ Mojave System A: Mojave, El Paso 400 MMcfd Case (all from Texas) and Transwestern

3/ Mojave System B: Mojave, El Paso 400 MMcfd Alternative 100/300, Northwest 100 MMcfd Case, and Transwestern

4/ Mojave System C: Mojave, El Paso 600 MMcfd Alternative (100/500 Case), and Northwest 100 MMcfd Case

5/ Mojave System D: Mojave, El Paso 600 MMcfd Alternative (200/400 Case), and Northwest 200 MMcfd Case

6/ NSI = No Significant Impact

System C was included as an alternative which could eliminate the need for the proposed Transwestern looping of 356 miles of pipeline. It includes the assumption that an additional 100 MMcfd would be supplied by Northwest. This assumption, as noted for Systems B and D, may not be necessary. El Paso could supply the entire 600 MMcfd to Mojave from west Texas, again with no involvement by Transwestern. This could require looping of about 108 miles of El Paso's San Juan Crossover system in Texas and New Mexico in addition to most of the facilities required in the 100/500 case. The facilities needed between Bondad and Valve City for the 100/500 case would not be needed. The unnecessary facilities for such a 0/600 case are the compression at Bondad and the 14.6 mile-long Blanco Loop.

This 0/600 case is identified here for information only; analysis of the facilities required along the San Juan Crossover has not been included for four reasons. The first is that the 0/600 case facilities were identified too late for inclusion in the FEIR/S. Second, since any system not including Transwestern (the 100/500 or the 0/600) would require new filings, the additional impacts could be analyzed if such filings were made. Third, because of the proximity of the El Paso and Transwestern pipelines in New Mexico the impacts are expected to be similar. And finally, the 100/500 case allows the decision-makers to view a representative system without Transwestern to determine whether approval of Transwestern's portion of the project is needed.

1.2.1 Mojave System A (the Proposed System): Mojave, El Paso 400 MMcfd Case (all from Texas) and Transwestern

This system is comprised of the proposed projects of each of these companies; it would entail approximately 754 miles of pipeline broken down into three components: the 383 miles of new pipeline and one new compressor station needed for the Mojave proposal; 14.8 miles of looping of an existing line for the El Paso 400 MMcfd proposal; and approximately 356 miles of loops for the Transwestern proposal. Transwestern's application states it could deliver up to 320 MMcfd; however, Mojave's proposed capacity is 600 MMcfd and it is currently unknown if Mojave could transport the additional available 120 MMcfd. This document assumes it could not without additional facilities.

The proposed action would not significantly affect air quality concerns along the route in either construction or operation. The proposed compressor station (MJ-1) would meet all applicable state and federal regulations. The compressor station would represent a permanent fixed emission source requiring permits for construction and operation. Construction impacts to air quality would represent a temporary source of both dust and engine emissions. A positive change to air quality in the southern San Joaquin Valley would also occur.

This proposal would cross at least 18 Quaternary surface faults. The potential for surface fault rupture would be greatest in the western portions of the route. Pipeline design should be capable of withstanding fault ruptures with adequate pipe strength and block valves in appropriate areas.

The pipeline route would contain approximately 27 miles of potential landslide areas. The potential landslide areas would occur primarily along the El Paso and Transwestern routes. In addition to the miles of landslide potential, 69 miles of the route would be constructed in areas with a slope of greater than 30 percent. These areas are concentrated along the Transwestern line and in the Tehachapi Mountains portion of the Mojave line.

Approximately 4,768 acres of the route would occur in areas with soils having a poor reclamation potential. These areas would occur along all three routes. The limiting factor on soils involves both wind and water erosion. The main limiting factor on revegetation of these soils, however, is a lack of precipitation. Based on the climatic regime of the pipeline routes, the potential for stabilizing these soils would be low and would certainly take more than five years.

The route would cross 74 intermittent and perennial streams. Three perennial stream crossings would be necessary.

There would be approximately 30 miles of medium to high potential impacts to groundwater resources. It is unlikely that impacts to groundwater would be significant if the proper mitigation measures were taken during construction. Construction mitigation measures with regard to groundwater should concern the prevention of spills during the fueling and maintenance of construction equipment, and avoidance of adverse effects on springs.

The Mojave proposal would have no impacts to freshwater biology since no sensitive stream crossings were identified.

Although it would temporarily disturb 8,465 acres of native vegetation, the proposed route would not cross unique or extremely sensitive vegetation types except for Joshua trees and cactus which are scattered in the creosote bush and saltbush vegetation types. The route would keep 1,765 acres of woody vegetation, primarily creosote bush, cleared from the operational ROW for the life of the project. Due to the low revegetative potential along the pipeline route, revegetation of the woody plant species may not occur for well over 50 years. Construction of the route would also impact approximately 61 acres of riparian habitat. These habitats, however, should recover quickly.

The proposed route has the potential to impact one federally threatened plant species and its habitat. This would represent approximately 60 acres of federally listed plant species habitat located along the Transwestern route. Three California state listed plant species would be impacted. This plant habitat could occur along 947 acres of the Mojave route.

In addition to the impacts to native vegetation discussed above, the proposed route would temporarily disturb 767 acres of agricultural land, primarily along the Mojave route. Impact would not last over one agricultural season. The proposed route would also permanently remove 158 acres of vineyards and orchards from production.

The proposed Mojave System A route would cross 748 acres of big game high priority/critical habitat, 121 acres of big game migration corridors, and 56 acres of fawning areas. The route would impact no upland game bird sensitive habitat and no raptor nesting areas.

The proposed route would also impact 9,615 acres of habitat of wildlife species of special concern. Table 1.2-1 lists the acres of impacts for individual species. Significantly impacted species habitat would include California condor, desert tortoise, blunt-nosed leopard lizard, San Joaquin kit fox, black-footed ferret, and Mohave ground squirrel. Habitat disturbance to each of these species would all be in excess of 500 acres.

The construction workforce of the proposed route would place a significant but temporary demand on housing and campgrounds in portions of Arizona, New Mexico, and in San Bernardino County, California. This would inconvenience travelers and campers seeking accommodations if construction occurred during tourist seasons. Property tax revenues would increase more than 10 percent in five counties crossed by the pipeline, a significant positive impact. Other positive but not significant impacts would occur in total employment and overall income changes.

The proposed route would have no significant impacts to traffic since major roads along the route would be crossed by boring beneath them. Noise impacts caused by construction would be of a temporary nature and would only occur during working hours. Since the majority of the proposed route occurs in relatively uninhabited areas, noise resulting from construction would not present a problem. Noise resulting from compressor station operation would be monitored and should be below an L_{dn} of 55 dBA level used by FERC as being potentially significant at noise sensitive areas. The compressor station would be located in a low population area and noise levels would not exceed 50 dBA outside of the fenced boundary of the compressor station.

The proposed route would conflict with the operation of five recreation areas. These impacts would generally be temporary in nature but could produce significant impacts to the Parker 400 ORV race route. Other significant impacts could occur along the Havasu National Wildlife Refuge, Pacific Crest National Scenic Trail, Tehachapi Mountain Park, and Kern River State Park with interruption of traffic, noises, and temporary disturbance of vegetation as well as removal of vegetation from the ROW for the life of the project , soils, park facilities, and the natural visual scene.

Additional impact to recreation facilities would involve increased usage of park facilities by construction workers. This impact would be temporary and not significant.

Major, probably permanent, visual impact would be experienced at the Tehachapi Mountain Park and the Kern River State Park. Significant temporary impact would include severe traffic disruption and noise.

The proposed route would conflict with zoning regulations around the Golden Shores Subdivision along the Mojave Transfer Line. The Transfer Line would also conflict with the land use of the Havasu National Wildlife Refuge and lies outside of utility corridors in the Yuma BLM District. The route would be outside of the BLM California Desert Conservation Area utility corridor between Pisgah and Boron in San Bernardino County. The BLM policy is to follow the corridor whenever possible. The route has the potential to conflict with the land use plans of Edwards Air Force Base in Kern County. Conflict exists in the Stallion Springs Community, Tehachapi Mountain Park and Kern River State Park.

Part of Transwestern's Loop G would not be in conformance with the Coconino National Forest Plan. This conflict could be easily resolved by keeping Loop G north of the existing line in the vicinity of the Fort Valley Experimental Forest.

The System A route contains eight 25-mile segments which have a high cultural resources sensitivity rating. This sensitivity rating is based on estimated site density within the analysis corridor as determined by previous surveys, the presence of both State and National Register properties, the crossing of Indian reservation lands, and terrain analysis, e.g., presence of major water sources (see FEIR/S Cultural Resources Technical Report for more details). Compliance procedures should provide adequate mitigation of potential significant impacts.

Approximately 3,205 acres of significant paleontological formations would be crossed by the proposed route. Since this figure indicates potentially significant areas, it is difficult to determine the exact amount of significant formations. Implementation of the mitigation measures in this document would reduce the potential impacts to paleontological resources to insignificance.

No areas with potentially high visual impact have been identified. This is primarily due to the nature of the proposed action since all but 383 miles would consist of looping existing pipeline. The new construction along the Mojave route in the

Mojave Desert would primarily occur adjacent to existing pipelines and thus would not constitute a visual intrusion.

Safety related impacts could occur along portions of the Mojave System A route. The primary areas of concern include housing near Indian John Spring, Stallion Springs residential community, and the residential areas of Bakersfield. These safety concerns revolve around fault crossings and the normal concerns associated with potential pipeline ruptures.

1.2.2 Mojave System B: Mojave, El Paso 400 MMcfd Alternative (100/300 Case), Northwest 100 MMcfd Case, and Transwestern

The four component System B alternative would entail approximately 777 miles of pipeline. The Mojave and Transwestern portions of the route would remain the same as those discussed in Section 1.2.1. Under this alternative El Paso would require 29.4 miles of looping (three loops) and 3,580 hp of compression. Northwest would deliver 100 MMcfd to El Paso at the Bondad Compressor Station. This system would require 8.1 miles of expansion looping on Northwest's line. This single loop would be the Muddy Creek Loop in southwestern Wyoming, beginning at the Muddy Creek Compressor Station. The looping would consist of 24-inch O.D. pipe. Three new compressor stations would be also added, one at Topock as proposed for System A, the Cisco and Cahone stations for Northwest, as well as the additional compression at the Bondad, Green River, and Ignacio stations.

This alternative would still supply 720 MMcfd of natural gas to the Mojave Pipeline Company at Topock, Arizona.

This alternative action would not significantly affect air quality concerns along the route for either construction or operation. The compressor stations would meet all state and federal regulations.

This alternative would encounter at least 19 Quaternary faults. The potential for surface fault rupture would be greatest in the western portions of the Mojave route. Adequate pipeline design criteria should mitigate hazards associated with the faults.

The alternative would contain approximately 43 miles of potential landslide areas, 16 more miles than for the System A route. The majority of the landslide potential would occur on the El Paso route. Approximately 74 miles of the route would be built in areas with slopes of greater than 30 percent. This is five more miles of potentially unstable areas on the El Paso line.

Approximately 4,914 acres of the route would occur in areas with soils having a poor reclamation potential. This represents 146 more acres with poor reclamation potential than with the System A route. The limiting factor on soils again is the lack of precipitation in the region.

This route would cross 78 intermittent and perennial streams, four more than the previously discussed route. A total of three perennial stream crossings would be necessary, the same as discussed for System A. None of the perennial stream crossings have a moderate or high significance rating.

The potential for impact to groundwater resources could occur along 30 miles of the route, the same as discussed above. Mitigation measures should virtually eliminate the potential for impact.

As with the routing discussed above, there would be no impacts to freshwater biology.

System B would temporarily disturb 8,465 acres of native vegetation and like the System A proposal would not cross unique or extremely sensitive vegetation types except for Joshua trees and cactus which are scattered in the creosote bush and saltbush vegetation types. This routing would result in the same acres of temporary disturbance to native vegetation types as System A.

The route would keep 1,765 acres of woody vegetation, primarily creosote bush and other shrubby species, cleared from the operational ROW for the life of the project. This represents the same number of acres of permanent disturbance as was discussed above for System A. The construction of the route would affect approximately 61 acres of riparian habitat, similar to that discussed for the previous system.

This route has the potential to impact one federally threatened plant species and its habitat, the same as the System A route. This would represent approximately 60 acres of federally listed plant species habitat, the same as System A. Three California state listed plant species would be impacted. These plant habitats could occur along 947 acres of the Mojave route, the same as those discussed for System A.

This routing would temporarily disturb 767 acres of agricultural land, the same as for the route discussed above. This route would also permanently remove the same number of acres of orchards and vineyards from production.

System B would cross 748 acres of big game high priority/critical habitat, 121 acres of big game migration corridors, and 56 acres of big game fawning areas. The crossing of critical habitat and migration corridors would be the same as would occur on the System A route. The System B route would impact no upland game bird sensitive habitat and would not impact any raptor nesting areas.

The System B route would impact 9,915 acres of habitat of wildlife species of special concern. Significantly impacted habitat would include that of the California condor, desert tortoise, blunt-nosed leopard lizard, San Joaquin kit fox, black-footed ferret, and Mohave ground squirrel. Table 1.2-1 shows the direct comparisons on all wildlife species of special concern. This increase over System A is in black-footed ferret habitat.

The construction workforce would place a significant but temporary demand on housing and campgrounds in the Wyoming, Arizona, New Mexico, and San Bernardino County areas. Property tax revenues would increase more than 10 percent in five counties crossed by the pipelines.

As with System A, this alternative would have no significant impacts on traffic. Noise levels would be similar to those discussed above; however, since three new compressor stations would be required along with the additional compression required at Bondad, Green River, and Ignacio this route would create more permanent noise.

This route would have similar impacts to recreation areas and land use as those discussed for System A.

The System B route contains nine 25-mile segments having a high cultural resources sensitivity rating, one more than System A. Archaeological compliance procedures, however, should mitigate the potential significant impacts.

Approximately 3,263 acres of significant paleontological formations would be crossed by this route. This would be 58 more acres than the System A route.

No areas of potentially high visual impact have been identified for either System A or System B.

The System B route has safety concerns similar to those addressed for System A.

1.2.3 Mojave System C: Mojave, El Paso 600 MMcfd Alternative (100/500 Case), and Northwest 100 MMcfd Case

This three-component alternative would entail approximately 587 miles of pipeline construction. The Mojave proposal under this scenario would not require the Mojave Transfer Line since all of the gas required to supply Mojave would come from the El Paso line. The El Paso 600 MMcfd Alternative (100/500 Case) would require 211.9 miles of looping of an existing El Paso line running from the Bondad Compressor Station in La Plata County, Colorado, to Topock in Mohave County, Arizona, as well as additional compression at Bondad. This would be accomplished by constructing thirteen separate loops of primarily 34-inch O.D. pipe.

The 100/500 Case would receive 100 MMcfd of natural gas from Northwest. The Northwest facilities would remain unchanged from those discussed for System B.

System C could supply 600 MMcfd of natural gas to the Mojave Pipeline Company receipt point at Topock. It would provide the exact amount of gas that Mojave has proposed to carry in its application.

This alternative would not significantly affect air quality along the route in either construction on operation. The three new compressor stations and additional compression at three other stations would meet all applicable state and federal air quality regulations. Air quality concerns, therefore, would be similar to those for System B.

This alternative would encounter at least 16 Quaternary surface faults, two and three fewer than for either Systems A or B, respectively. Design criteria should be addressed to minimize the effects of fault rupture. All of these are on the Mojave mainline and laterals.

This route would contain approximately 80 miles of potential landslide areas. These 80 miles represent a 56 and 37-mile increase over those discussed in Systems A and B. In addition to the miles of landslide potential, 44 miles of the route would be constructed in areas with a slope greater than 30 percent. This would be 25 and 30 fewer miles than those identified for the System A and B routes respectively.

Approximately 3,477 acres along the alternative route would occur in areas with soils having poor reclamation potential. This acreage is 1,291 fewer than for the proposal discussed for System A, and 1,437 fewer acres than identified for System B. Again reclamation potential is primarily tied to precipitation and thus the Mojave and El Paso routes account for most of these acres.

This route would cross 67 intermittent and perennial streams; seven fewer than for System A and 11 fewer than for System B. It would cross three perennial streams, unchanged from the proposals discussed above. None of these stream crossings would have moderate to high significance, the same as identified for both Systems A and B.

Approximately 22 miles of groundwater resources could be adversely affected. This represents 8 fewer miles than for Systems A or B. Again, mitigation measures, particularly oriented toward preventing refueling spills, should mitigate the affects to groundwater.

This system, like the other two, would have no significant impacts to freshwater biological resources.

System C would temporarily disturb 6,563 acres of native vegetation, 1,902 fewer acres than for Systems A and B. No unique or extremely sensitive vegetation types except for Joshua trees and cactus would be crossed. This route would keep 1,774 acres of woody vegetation cleared from the operational ROW for the life of the project. This is nine more acres than were identified for the System A and B routes. Construction of this route would impact approximately 61 acres of riparian habitat, the same as for Systems A and B.

This route would not impact any federally threatened or endangered plant species, one fewer than either the System A or B routes. No acres of federally threatened or endangered plant species habitat would be impacted, 60 fewer than either System A or B. Three California state listed plant species would be impacted. This plant habitat could occur along 947 acres of the Mojave route and would not represent any increase or decrease over the two previously discussed systems.

This route would also temporarily disturb 731 acres of agricultural land, 36 fewer than either System A or B. Again, these impacts would not last beyond one agricultural season. The route would permanently remove 158 acres of orchards and vineyards from production.

The Mojave System C route would impact 564 acres of big game high priority/critical habitat. This is 184 fewer than either the System A or B routes. The impacts to big game migration corridors would remain unchanged. There would be impact to 56 fewer acres of fawning areas. Impacts to upland game bird sensitive habitat would be 24 acres, as opposed to no impacts for either the System A or B route. The route would not impact any raptor nests, unchanged from the System A and B routes.

The alternative route would also impact 9,419 acres of wildlife habitat of species of special concern. This represents an decrease of 196 acres over System A and a decrease of 496 over System B. There would be an increase in the habitat of the desert tortoise. System C would affect more black-footed ferret habitat than System A but less than System B. Significantly impacted habitat would include that for the California condor, desert tortoise, blunt-nosed leopard lizard, San Joaquin kit fox, black-footed ferret, and Mohave ground squirrel.

The construction workforce would place a significant but temporary demand on housing and campgrounds in southwestern Wyoming, and portions of Arizona, New Mexico and San Bernardino County in California. This impact would remain essentially the same as discussed above, although impacts in Arizona and New Mexico may not be as severe since both El Paso and Transwestern workforces would not be in the area simultaneously. Property tax revenues would increase more than 10 percent in only one county crossed by the pipeline.

Traffic and noise impacts would remain similar to those discussed for System B. Impacts to recreational facilities would also remain similar to those discussed for Systems A and B, except for the Havasu National Wildlife Refuge.

The proposed route would not conflict with zoning regulations around the Golden Shores Subdivision nor the Havasu NWR since the Mojave Transfer Line would not be needed. The westernmost 4.2 miles of the Flagstaff Loop of the El Paso alternative would be in conflict with the Coconino National Forest's Elden Environmental Study Area. The conflicts associated with the Transwestern line concerning the Coconino National Forest Plan would not be present. The remainder of the land use problems would remain the same as those discussed for both the System A and B routes.

System C contains eight 25-mile segments with a high cultural resources sensitivity rating, one less sensitive segment than System B and the same number of sensitive segments as System A. Compliance procedures should provide adequate mitigation to avoid potentially significant impacts caused by construction.

System C could impact 2,724 acres of significant paleontological formations. This represents 481 fewer than for System A and 539 fewer than for System B.

No areas of potentially high visual impact have been identified along this routing alternative.

Safety concerns would be the same as those discussed for Systems A and B.

1.2.4 Mojave System D: Mojave, El Paso 600 MMcfd Alternative (200/400 Case), and Northwest 200 MMcfd Case

This three-component alternative would entail approximately 752 miles of pipeline construction. The Mojave proposal under this scenario would not require the Mojave Transfer Line since all of the gas required to supply Mojave would come from the El Paso line. The El Paso 600 MMcfd Alternative (200/400 Case) would require 223.7 miles of looping of an existing El Paso line running from the Bondad Compressor Station in La Plata County, Colorado, to Topock in Mohave County, Arizona. This would be accomplished by constructing 13 separate loops of primarily 34-inch O.D. pipe. Additional compression would be required at two existing compressor stations.

Northwest would transport 200 MMcfd down its Sumas, Washington, to Ignacio, Colorado, line. This gas delivery would require facility expansions between the Muddy Creek Compressor Station in Wyoming to Ignacio, Colorado. These expansions would consist of 162 miles of looping in seven sections as well as construction of two new compressor stations. The looping would consist of 24-inch O.D. pipe.

System D could supply 600 MMcfd of natural gas to the Mojave Pipeline Company receipt point at Topock. It would provide the exact amount of gas that Mojave has proposed in its application.

This alternative system would not significantly affect air quality along the route for either construction or operation. The three new compressor stations and additional compression at four others would meet all applicable state and federal air quality regulations. Air quality concerns, therefore, would be similar to those discussed for System C.

System D would encounter at least 17 Quaternary surface faults, one fewer than System A, two fewer than System B, and one more than System C. Again, design criteria should be addressed to minimize the effects of fault rupture.

This route would contain approximately 179 miles of potential landslide areas. The majority of the landslide areas would occur along the Northwest route particularly in the vicinity of Rangely Loops A and B. These 179 miles represent a 152 and 136-mile increase over those discussed in Systems A and B, and a 99-mile increase over System C. In addition to the miles of landslide potential, 69 miles of the route would be constructed in areas with a slope greater than 30 percent. This would be the same as for System A, five fewer miles than those identified for System B, and 25 more miles than those identified for System C.

Approximately 4,057 acres along the alternative route would occur in areas with soils having poor reclamation potential. This acreage is 711 and 857 fewer than for Systems A and B respectively and 580 more than for System C. Again reclamation potential is primarily tied to precipitation and thus the Mojave and El Paso routes account for most of these acres.

This route would cross 126 intermittent and perennial streams, of which 15 are perennial. Nine of these stream crossings would have moderate to high significance with all of the significant crossings occurring on the Northwest line. This would be 52, 48, and 59 more perennial and intermittent stream crossings than Systems A, B, and C, respectively, 12 more perennial stream crossings than Systems A, B, and C, and nine more moderate to high significance stream crossings than Systems A, B, or C.

Approximately 22 miles of groundwater resources could be adversely affected. This represents eight fewer miles than those identified for Systems A and B, respectively, and the same as were identified for System C. Again, mitigation measures, particularly geared toward preventing refueling spills and disruption of springs should mitigate the effects to groundwater.

This system, like the other three, would have no significant impacts to freshwater biological resources.

System D would temporarily disturb 8,470 acres of native vegetation, 5, 5, and 1,907 more than identified for Systems A, B, and C, respectively. No unique or extremely sensitive vegetation types except for Joshua trees and cactus would be crossed. This route would keep 1,774 acres of woody vegetation cleared from the operational ROW for the life of the project. This is nine more than for the System A and B routes, and the same as would be disturbed by the System C route. Construction of this route would impact approximately 71 acres of riparian habitat, 10 more acres of disturbance than would occur on Systems A, B, or C.

This route could impact two federally threatened or endangered plant species, one more than for the System A, B, or C routes. Seventy-five acres of federally threatened or endangered plant species habitat could be impacted, 15 acres more than Systems A or B and 75 acres more than for System C. Three California state listed plant species would be impacted. This plant habitat could occur along 947 acres of the Mojave route and would not represent any increase or decrease over the three previously discussed systems.

This route would also temporarily disturb 915 acres of agricultural land, 148 more than Systems A or B and 184 more than discussed for System C. Again, these impacts would not last beyond one agricultural season. The route would permanently remove 158 acres of orchards and vineyards from production, unchanged from the systems discussed above.

The Mojave System D route would impact 1,553 acres of big game high priority/critical habitat. This is 805 more than the System A and B routes and 989 more than the System C route. The impacts to big game migration corridors would remain unchanged. The impacts to fawning areas would occur on 56 fewer acres than for Systems A and B and would be unchanged from System C. Impacts to upland game bird sensitive habitat would be on 30 acres more than either System A or B, and six more acres than the System C route. The route would also impact two raptor nests, as opposed to no impacts for Systems A, B, or C.

The route would also impact 10,337 acres of wildlife habitat of species of special concern. This represents an increase of 722 acres over System A, 422 acres over B, and a 918-acre increase over System C. These increases would occur for the habitats of the desert tortoise and black-footed ferret. Significantly impacted habitat would include that of the California condor, desert tortoise, blunt-nosed leopard lizard, San Joaquin kit fox, black-footed ferret, and Mohave ground squirrel.

The construction workforce of System D would place a significant but temporary demand on housing and campgrounds in areas of

Wyoming, Colorado, Utah, portions of Arizona and New Mexico, and San Bernardino County in California. This impact would remain essentially the same as that discussed for System C. Property tax revenues would increase more than 10 percent in three counties crossed by the pipeline.

Traffic and noise impacts would remain essentially unchanged from those discussed for System C. Impacts to recreational facilities would remain essentially unchanged from those discussed for System B.

System D would not conflict with zoning regulations around the Golden Shores Subdivision nor with the Havasu NWR since the Mojave Transfer Line would not be needed. The westernmost 4.2 miles of the Flagstaff Loop of the El Paso 200/400 Alternative would be in conflict with the Coconino National Forest's Elden Environmental Study Area. Other potential land use conflicts could occur along the Northwest route in the vicinity of Moab, Utah, where the first 1.5 miles of the Moab Loop would be within substantial residential and commercial development and east of Arches National Park, where the Cisco Loop would be adjacent to the Lost Springs WSA. The conflicts associated with the Transwestern line concerning the Coconino National Forest Plan would not be present. The remainder of the land use problems would remain the same as those discussed for System A.

System D contains three 25-mile segments with a very high cultural resources sensitivity rating and ten 25-mile segments with a high sensitivity rating. This represents a significant increase over any of the systems previously discussed. Compliance procedures should provide adequate mitigation to potential significant impacts caused by construction.

System D could impact 3,580 acres of significant paleontological formations. This represents 375, 317, and 856 more than Systems A, B, and C, respectively.

No areas of potentially high visual impact have been identified along this routing alternative.

The System D route would have the same types of safety concerns as were discussed above.

1.2.5 Mojave Alternative A

Alternative A (FEIR/S, IV/Map 1, sheets 11-12) is an alternative to the proposed Mojave Transfer Line. It would follow BLM utility corridors occupied by an existing transmission line in one case and Interstate 40 and an existing El Paso ROW in the other case. It would be in Mohave County, Arizona.

Alternative A would entail construction of 23 miles of pipeline compared with the 16.5 miles of construction necessary for the Mojave Transfer Line.

Impacts to air quality and geology would remain unchanged from those for the Mojave Transfer Line.

The Mojave Alternative A route would include 230 acres of area with soils with a poor reclamation potential compared to 162 acres for the Mojave Transfer Line.

Surface water and freshwater biology impacts would likely remain unchanged from those for the Mojave Transfer Line. However, since the route is four miles from the nearest surface water the potential for impact would be less.

There is little potential for groundwater impacts along Alternative A.

The Alternative A route would temporarily disturb 280 acres of native vegetation compared with 206 acres for the Mojave Transfer Line. Alternative A would keep 136 acres of woody vegetation cleared from the operational ROW for the life of the project while the Mojave Transfer Line would keep 103 acres of woody vegetation permanently cleared for the life of the project. Alternative A would impact approximately 10 acres of riparian habitat compared with only one acre on the Mojave Transfer Line.

Neither Alternative A nor the Mojave Transfer Line routes would involve impact to federally listed plant species or their habitat.

The Alternative A route would involve no change in the effect of the project on the number of acres of big game high priority/critical habitat, big game migration corridors, upland game bird sensitive habitat, and raptor nesting areas.

The Alternative A route would have 633 acres of impact to the wildlife habitat of species of special concern as opposed to 502 acres for the Mojave Transfer Line. These increased impacts would be confined to the Yuma clapper rail, bald eagle, peregrine falcon, and desert tortoise. The likelihood of impact to these species, however, would be reduced since the habitat is not as conducive as the habitat along the Transfer Line.

Socioeconomic, noise, and recreation impacts along Alternative A would remain similar to those discussed for the Mojave Transfer Line. Traffic impact would be less for Alternative A.

Alternative A would have fewer land use conflicts. The location of Alternative A would resolve the zoning problems around the Golden Shores Subdivision and would eliminate the minor potential for impact to the Havasu National Wildlife Refuge and would be within a designated utility corridor through the Yuma District of the BLM.

No changes in the number or kinds of impacts concerning cultural, paleontological, visual resources or system safety were identified along the Alternative A route when compared to the Mojave Transfer Line.

1.2.6 Mojave Alternative B

Alternative B (FEIR/S, IV/Map 1, sheets 13-14) follows BLM-designated utility planning corridor G/All American Pipeline ROW between Pisgah and Boron, California. It departs from the proposed Mojave mainline route at about MP 115 and ties back in near MP 191.

Alternative B would entail the same amount of pipeline construction (76 miles) as the replaced portion of the Mojave Mainline.

Alternative B would not cause additional impacts to air quality. Except for a one mile increase of slope greater than 30 percent, Alternative B would have the same geological impact as the replaced portion of the Mojave Mainline.

Alternative B would have 770 acres of impacts to soils with poor reclamation potential compared with 764 acres for the replaced portion of the line.

Impacts to surface water with regard to stream crossings would increase by one. This would occur in intermittent stream crossings and would not be significant.

Groundwater impacts along Alternative B could be five miles less than the replaced portion of the route.

No change in impacts to freshwater biology would occur.

Since Alternative B is essentially the same length as the replaced portion of the mainline and since it traverses similar vegetative types, there are no significant differences in the total number of acres of native vegetation temporarily disturbed, acres of woody vegetation kept cleared for the life of the project, acres of riparian habitat crossed, acres of agricultural land temporarily disturbed, or the number of federally threatened or endangered plant species or California state listed plant species affected.

The Mojave Alternative B route would cause no different impact to general wildlife concerns than the proposed action (see Table 1.2-1).

The Alternative B route would cause 1284 acres impact to the habitat of wildlife species of special concern compared with 1236 acres of impact to the replaced portion of the mainline. This increase in impacts would occur only in the habitat of the Mohave ground squirrel, where Alternative B would impact 363 acres of habitat as opposed to 315 acres of disturbance associated with the mainline portion of the route.

Impacts to socioeconomics including permanent noise and recreation would remain unchanged for the Alternative B route. Traffic impacts would be more extensive but insignificant.

One land use conflict would be resolved by utilizing Alternative B. Alternative B is entirely within an existing utility corridor across BLM lands in California. Utilizing the utility corridor, however, may involve additional conflicts with residential areas in Daggett, Barstow, and Boron.

Two 25-mile segments having high cultural resources sensitivity ratings are found along Alternative B, one more than would be found along the replaced portion of the mainline.

Significant paleontological resources would occur within 640 acres along Alternative B; the Mojave mainline portion it would replace contains 793 acres of significant formations.

The Alternative B route contains no areas of high visual significance and thus remains unchanged from the mainline.

The Alternative B route has the potential to impact a greater number of residences from a safety perspective. The likelihood of a pipeline rupture occurring however is remote.

1.2.7 The Mojave System Best Case

1.2.7.1 The Mojave Proposal

The environmentally preferable Mojave System is System C described in Section 1.2.3 using Alternative B as described below. This decision was made by comparing the data listed in Table 1.2-1 and deciding which of the Mojave Systems and Alternatives would have the least impact to the physical and social environment.

Based on the discussions above, the combination of Mojave's proposed and alternative routes with the least environmental impact includes Alternative B. The U.S. Fish and Wildlife Service (USFWS) has expressed opposition to the Mojave Transfer Line because two portions of it, totaling under three miles in length, are within the boundaries of the Havasu National Wildlife Refuge. The USFWS favors the use of Alternative A. The extra distance and cost of the Alternative A route is not warranted by the minimal environmental effects which would occur in the refuge. No wetland areas would be affected by the Mojave Transfer Line, since all of the route is on the opposite side of Highway 95 from the body of the refuge, and all of the route is immediately adjacent to existing El Paso pipelines, some of which have been installed within the last two to three years. With the exception of avoiding the fringes of the NWR, minor portions of the Fort Mojave Indian Reservation and the Golden Shores Subdivision, and the lower potential for impact to groundwater, all other environmental aspects of Alternative A are similar to or worse than to the proposal. In addition, it is seven miles longer and would cost about $2,800,000 more than the proposal, an increase of about 40 percent. In addition, it should be understood that the mainline also crosses the refuge, as must any project involving a crossing of the Colorado River. Recognizing that there is a difference of opinion concerning the routing of the Mojave Transfer Line through the refuge, the staff will not oppose the use of Alternative A, but it will not ask the FERC to require it either.

Alternative B would be completely within a designated utility corridor. Although it would be closer to residential areas than the proposed route, it should have no significant effect on existing residences beyond the construction period. Most of the route near Barstow is within floodplain areas of the Mojave River where development is unlikely to occur. Near Daggett the route would be adjacent to Interstate 40 where development is unlikely; moreover, it would be immediately adjacent to PG&E's existing pipeline and would therefore constitute no new impediment to development. No development currently exists along either Alternative B or the proposed route near Boron. For this reason the relative impact of the alternative and the proposed route is the same. Further, use of El Dorado's proposed alignment between Daggett and Boron avoids the floodplain and existing residential areas in Barstow.

1.2.7.2 The Supply Systems: A through D

The air quality impacts for all of the systems would be similar.

Impacts to geology would be quite different along the four systems. The System C route would only cross 16 potential surface fault rupture areas, two fewer than System A, three fewer than System B, and one less than System D. In addition, only 44 miles of areas with slopes greater than 30 percent would be crossed. This is significantly lower than either the System A, B, or D routes. Finally, although the System C route would affect more miles of route with potential landslide and slope stability problems than System A or B, the areas would generally occur in arid regions of New Mexico and Arizona rather than in the mountainous portions of the Rocky Mountains in Colorado which would occur along the System D route. Based on these findings, impact to geology would be less on the System C route.

Impacts to soils would occur along all routes; however, since the System C route represents the fewest miles of construction and yet generally crosses the same types of soils as the other systems, it would have the fewest acres with poor reclamation potential.

Surface water impacts would be quite different along the four system routes. The most pertinent categories in Table 1.2-1 would be perennial stream crossings and moderate/high significance stream crossings. Using these two categories, the Systems A, B, and C would have less impact to surface water, and substantially less than System D.

Possible impacts to groundwater vary between 22 and 30 miles among the four routes. This is based primarily upon the miles of construction within the areas where there is a moderate to high use of shallow groundwater. Using mileage as a determining criterion, Systems C and D would have the least potential impacts to groundwater resources although groundwater impacts would be few if adequate mitigation measures were employed.

None of the four system routes would have any adverse impacts to freshwater biology.

Impacts to vegetation can be divided into two subcategories: general vegetation disturbance and impacts to threatened and endangered species. Impacts to general vegetation would be generally dependent on the miles of construction (see Table 1.2-1). Based on these figures, the System C route would have less impact than either the System A, B, or D routes. Impacts to threatened or endangered plant species would be of more concern than those to general vegetation. The System C route would have the least potential to significantly impact threatened or endangered plants.

Wildlife impacts can also be divided into two subcategories: general wildlife disturbance and disturbance to threatened or endangered species. In this instance, the System C route has the potential to impact fewer general wildlife species and fewer acres of threatened or endangered species habitat. The difference between System A and System C would only be 196 acres.

Socioeconomic impacts on the Mojave proposal would not cause major problems. Permanent noise impact would be less on the System A route since five to six fewer permanent noise generating sources would be present. The System A route would require only one compressor station, five fewer than System B and six fewer than Systems C or D. All but two of these stations currently exist. Impacts to recreational facilities are similar for all systems.

Land use impacts would be similar along Systems A and B. System C would have three fewer areas of impacts. System D would have one less land use conflict than Systems A and B.

Impacts to cultural resources are difficult to determine prior to completion of a Class III cultural resources survey of the route. Based upon the current state of knowledge, the System A route has the potential to impact fewer sites than either the System B, C, or D routes and has the potential to impact fewer NRHP sites. The System A route has the same number of high sensitivity segments as System C but fewer than either Systems B or D.

Finally, impacts to paleontology would be less severe along the System C route.

Based on all of the data presented above, the System C route would cause fewer significant impacts to geology, soils, surface water, groundwater, vegetation, portions of wildlife, socioeconomics, land use, and paleontology. The System C route is definitely the overall superior route concerning environmental impacts.

Also using the data presented above, the System D route represents the least favorable route from an environmental perspective. It has the highest impact to geology, surface water, wildlife, socioeconomics, land use, cultural resources, and paleontology. The System A and B routes impacts generally fall between the System C and D routes.

1.3 EL DORADO ALTERNATIVE

The El Dorado Interstate Transmission Company proposed to construct an interstate natural gas pipeline into Kern County, California, from Mohave County, Arizona. [1] The El Dorado system would be approximately 381 miles long. Four components make up the El Dorado system. The North Receipt Lateral in Mohave County would consist of approximately 16.5 miles of new pipeline. The mainline would consist of approximately 256 miles of new pipeline. The East Delivery Lateral would consist of 36 miles of new pipeline, and the West Delivery Lateral would consist of 72.5 miles of new pipeline in the San Joaquin Valley of California.

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[1] On October 27, 1986, Administrative Law Judge Isaac D. Benkin of the FERC ordered that the El Dorado application be dismissed with prejudice. Actual dismissal was subject to the Commission's review. On October 14, 1987, the Commission adopted the initial decision of the Administrative Law Judge, dismissed the El Dorado application, and terminated the dockets before FERC. One June 30, 1987, the California State Lands Commission denied, without prejudice, the El Dorado application. Due to the timing of this EIR/EIS, a decision was made to leave the information on El Dorado in the final EIR/EIS to allow the reader to judge El Dorado as an alternative to the remaining companies in competition.

As with the Mojave proposal (Section 1.2), the El Dorado Interstate Transmission Company must obtain gas from outside sources. The same two natural gas transmission companies which plan to supply gas to Mojave could also supply gas to El Dorado. Although El Dorado proposes to deliver only 520 MMcfd of natural gas to the EOR/cogen market, the systems that follow will be capable of delivering 720 or 600 MMcfd of gas to El Dorado in the same way they could deliver to Mojave. As with the Mojave proposal, utilization of the Northwest, El Paso, and Transwestern systems resulted in four major ways of delivering natural gas to the start point of the El Dorado system. These four systems and the three El Dorado route variations will be outlined below. This will be followed by a discussion of the major impacts for each system. Finally, the best system or systems will be selected. Table 1.3-1 compares the impacts of El Dorado and its alternatives.

1.3.1 El Dorado System A: El Dorado, El Paso 400 MMcfd Case, and Transwestern

This system would entail approximately 752 miles of pipeline broken down into three components. The 381 miles of new pipeline needed for the El Dorado would be supplied with natural gas in exactly the same manner as the Mojave proposal (see Section 1.2.1). As with the Mojave proposal, System A could supply up to 720 MMcfd of natural gas to the El Dorado Interstate Transmission Company at Topock, Arizona. Since the El Dorado application has stated that El Dorado would deliver only 520 MMcfd of natural gas to the EOR/cogen market, a surplus capacity of 200 MMcfd would be available.

The action would not significantly affect air quality along the route in either construction or operation. Construction impacts to air quality would represent a temporary source of both dust and engine emissions. Positive air quality effects would take place in Kern County as a result of implementation.

The route would encounter at least 18 Quaternary surface faults. The potential for surface fault rupture would be greatest in the western portions of the El Dorado route. Pipeline design should be sufficient to withstand surface fault ruptures.

The pipeline route would contain approximately 27 miles of potential landslide areas. The potential landslide areas would occur along the El Paso and Transwestern routes. In addition to the potential landslide areas, 82 miles of the route would be constructed in areas with a slope greater than 30 percent. These areas are again concentrated along the Transwestern line with the remaining miles of slope hazard occurring in the Tehachapi Mountains portion of the El Dorado route.

Approximately 4,343 acres of the route would occur in areas with potential poor reclamation soils. These areas would occur

Table 1.3-1

EL DORADO SUMMARY OF IMPACTS

	EL DORADO SYSTEM				EL DORADO 1/ ROUTE			
	System A 2/	System B 3/	System C 4/	System D 5/	El Dorado	Alternative A	Alternative B	Alternative C
AIR QUALITY	NSI 6/	NSI	NSI	NSI	NSI	NSI	NSI	NSI
GEOLOGY								
Surface fault rupture	18	19	16	17	16	0 (0)	0 (0)	0 (0)
Miles of land-slide potential	27	43	80	179	0	0 (0)	0 (0)	0 (0)
Miles of slope greater than 30%	82	87	57	82	38	0 (3)	4 (5)	4 (8)
SOIL								
Acres of poor reclamation potential	4343	4489	3052	3632	2296	548 (457)	22 (64)	41 (73)
SURFACE WATER								
Number of stream crossings	68	71	61	120	28	3 (3)	3 (3)	1 (1)
Intermittent stream crossings	65	68	58	105	25	3 (3)	3 (3)	1 (1)
Perennial stream crossings	3	3	3	15	3	0 (0)	0 (0)	0 (0)
Moderate/high significance perennial stream crossings	0	0	0	9	0	0 (0)	0 (0)	0 (0)
GROUNDWATER								
Miles of potential impact	15	15	7	7	7	0 (0)	0 (0)	0 (0)
FRESHWATER BIOLOGY								
Number of sensitive stream crossings with fish present	0	0	0	0	0	0 (0)	0 (0)	0 (0)
TERRESTRIAL BIOLOGY								
Vegetation								
Total acres of native vegetation temporarily disturbed	8549	8599	6697	8604	4576	914 (885)	100 (121)	56 (109)
Acres of woody vegetation kept cleared for the life of the project	1838	1838	1797	1797	1608	457 (442)	44 (60)	31 (42)

Table 1.3-1 (continued)

EL DORADO SUMMARY OF IMPACTS

	EL DORADO SYSTEM				EL DORADO 1/ ROUTE			
	System A 2/	System B 3/	System C 4/	System D 5/	El Dorado	Alternative A	Alternative B	Alternative C
Vegetation (continued)								
Acres of riparian habitat crossed	24	24	24	34	22	0 (0)	0 (0)	0 (0)
Acres of federally threatened or endangered plant habitat affected	60	60	0	75	0	0 (0)	0 (0)	0 (0)
Number of species	1	1	0	2	0	0 (0)	0 (0)	0 (0)
Acres of California state listed plant habitat affected	947	947	947	947	947	0 (0)	0 (0)	73 (73)
Number of species	3	3	3	3	3	0 (0)	0 (0)	3 (3)
Acres of agricultural land temporarily disturbed	525	525	489	673	489	0 (0)	0 (0)	12 (0)
Wildlife								
Big game crucial or high priority habitat (acres)	748	748	564	1553	85	0 (0)	0 (0)	0 (0)
Big game migration corridors (acres)	121	121	121	121	121	0 (0)	0 (0)	0 (0)
Big game fawning/ calving areas (acres)	56	56	0	0	0	0 (0)	0 (0)	0 (0)
Upland game bird sensitive habitat (acres)	0	0	24	30	0	0 (0)	0 (0)	0 (0)
Waterfowl critical nesting areas (acres)	0	0	0	0	0	0 (0)	0 (0)	0 (0)
Raptor nesting areas (nests)	0	0	0	2	0	0 (0)	0 (0)	0 (0)
Acres of potential threatened or endangered animal habitat	8819	9119	8799	9717	7446	912 (885)	107 (121)	139 (121)

Table 1.3-1 (continued)

EL DORADO SUMMARY OF IMPACTS

	EL DORADO SYSTEM				EL DORADO 1/ ROUTE			
	System A 2/	System B 3/	System C 4/	System D 5/	El Dorado	Alternative A	Alternative B	Alternative C
Wildlife (continued)								
Yuma clapper rail	97	97	36	36	73	0 (0)	0 (0)	0 (0)
Bald eagle	169	169	115	127	145	0 (0)	0 (0)	0 (0)
Peregrine falcon	490	490	121	121	163	0 (0)	0 (0)	0 (0)
Whooping crane	0	0	0	0	0	0 (0)	0 (0)	0 (0)
California condor	1492	1492	1492	1492	1492	0 (0)	104 (121)	68 (109)
Desert tortoise	2756	2756	2998	2998	2683	912 (885)	0 (0)	0 (0)
Blunt-nosed leopard lizard	388	388	388	388	388	0 (0)	0 (0)	0 (0)
Tehachapi slender salamander	0	0	0	0	0	0 (0)	3 (0)	3 (0)
San Joaquin kit fox	410	410	410	410	410	0 (0)	0 (0)	68 (12)
Black-footed ferret	1345	1645	1567	2473	0	0 (0)	0 (0)	0 (0)
Mohave ground squirrel	667	667	667	667	667	0 (0)	0 (0)	0 (0)
Nelson's antelope squirrel	412	412	412	412	412	0 (0)	0 (0)	0 (0)
Tipton kangaroo rat	24	24	24	24	24	0 (0)	0 (0)	0 (0)
Short-nosed kangaroo rat	436	436	436	436	436	0 (0)	0 (0)	0 (0)
Giant kangaroo rat	133	133	133	133	133	0 (0)	0 (0)	0 (0)
SOCIOECONOMICS								
Population change greater than 10%	No	No	No	No	No	No	No	No
Total employment change > 10%	No	No	No	No	No	No	No	No
Income change >10%	No	No	No	No	No	No	No	No

Table 1.3-1 (continued)

EL DORADO SUMMARY OF IMPACTS

	EL DORADO SYSTEM				EL DORADO 1/ ROUTE			
	System A 2/	System B 3/	System C 4/	System D 5/	El Dorado	Alternative A	Alternative B	Alternative C
SOCIOECONOMICS (continued)								
Vacancy rates of temporary housing less than 5%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local tax base change > 10%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Traffic	NSI	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Operational noise	NSI	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Recreation (conflicts)	3	3	2	2	2	0 (0)	0 (0)	0 (0)
LAND USE/OWNERSHIP								
Number of conflicts	6	6	3	5	5	0 (1)	1 (0)	0 (0)
CULTURAL RESOURCES								
Number of sites in direct impact zone	86	94	95	230	45	2 (5)	0 (2)	2 (1)
NRHP listed or eligible sites in the direct impact zone	2	2	2	6	2	0 (0)	0 (0)	0 (0)
Percentage of line actually surveyed	12	13	15	27	16	0 (0)	2 (2)	71 (0)
High sensitivity Segments	9	10	9	14	4	1 (0)	0 (0)	0 (0)
PALEONTOLOGIC RESOURCES								
Acres of impact to significant formations	2935	2993	2454	3309	1670	7 (65)	0 (0)	0 (0)
VISUAL RESOURCES								
Acres of high visual impact	318	318	318	318	318	0 (318)	0 (0)	0 (0)

1/ The first entry for each resource area under alternative routing represents the value for the alternative segment only; the value in parenthesis represents the comparable quanity for the portion of the proposed route which would be avoided by using this alternative.

2/ El Dorado System A: El Dorado, El Paso 400 MMcfd Case, and Transwestern

3/ El Dorado System B: El Dorado, El Paso 400 MMcfd Alternative (100/300 Case), Northwest 100 MMcfd Case, and Transwestern

4/ El Dorado System C: El Dorado, El Paso 600 MMcfd Alternative (100/500 Case), and Northwest 100 MMcfd Case

5/ El Dorado System D: El Dorado, El Paso 600 MMcfd Alternative (200/400 Case), and Northwest 200 MMcfd Case

6/ NSI = No Significant Impact

primarily along the El Dorado and Transwestern lines. The limiting factor on soil reclamation potential, a lack of precipitation, would inhibit revegetation efforts.

The route would cross 68 intermittent and perennial streams. Three perennial stream crossings would be necessary.

Potential impacts to groundwater could occur along approximately 15 miles of the proposed route. This is 15 miles less than Mojave Systems A and B. Because the El Dorado proposed route is higher and farther from the river and adjacent agricultural lands than the Mojave proposal and Mojave Alternative B in the vicinity of the Mojave River the potential for impact would be less. It is unlikely that impacts to groundwater would be significant if the proper mitigation measures were implemented during construction.

The El Dorado System A would have no impacts to freshwater biology since none of the stream crossings discussed in surface water has a potential to contain sensitive aquatic species.

This alternative would temporarily disturb 8,549 acres of native vegetation. None of the proposed route would cross unique or extremely sensitive vegetation types except for Joshua trees and cactus which are scattered in the creosote bush and saltbush vegetation types. The route would keep 1,838 acres of woody vegetation, primarily creosote bush, cleared from the operational ROW for the life of the project. Construction of the route would impact approximately 24 acres of riparian vegetation. These areas, however, should recover quickly.

The route has the potential to impact the habitat of one federally threatened plant species. This would represent approximately 60 acres of federally listed plant species habitat located along the Transwestern line. Three California state listed plant species would be impacted. These plants could occur along 947 acres of the El Dorado route.

The route would also temporarily disturb 525 acres of agricultural land, primarily along the El Dorado route. These impacts would not last beyond one agricultural season. The route would also permanently remove 273 acres of orchards and vineyards from production.

The El Dorado System A route would cross 748 acres of big game critical or high priority habitat, 121 acres of big game migration corridors, and 56 acres of big game fawning areas.

The route would impact 8,819 acres of wildlife habitat of species of special concern. Table 1.3-1 lists the acres of impacts for individual species. Significantly impacted species habitat (over 500 acres each) would include that for the California condor, desert tortoise, black-footed ferret, and Mohave ground squirrel.

The construction workforce would place a significant but temporary demand on housing and campgrounds in portions of Arizona, New Mexico and in San Bernardino County, California. These impacts would occur during the construction phase only. Property tax revenues would increase more than 10 percent in five counties crossed by the pipeline. Other positive although not significant impacts would occur in total employment and income changes.

The route would cause no significant impacts to traffic since all paved roads along the route would be crossed by boring beneath the pavement. Noise impacts caused by construction would be temporary and would generally occur during working hours. Since the majority of the proposed route is located in relatively uninhabited areas, noise resulting from construction should not present a problem.

The route could conflict with the operation of three recreation areas. These impacts would generally be temporary in nature but could produce significant impacts to the Havasu National Wildlife Refuge, Stoddard Valley Recreation Use Area and to the Pacific Crest National Scenic Trail. The remaining impacts to recreation facilities would involve traffic delays and noise around parks, and increased usage of park facilities by construction workers. These impacts would cease following completion of construction.

The El Dorado System A route would conflict with the Havasu National Wildlife Refuge, BLM corridors (Yuma District), and with zoning regulations around the Golden Shores Subdivision along the North Receipt Lateral. There are also land use conflicts on Edwards Air Force Base similar to those discussed for Mojave. In addition, there is a potential for conflict with the proposed Mojave National Park immediately north of the proposed route.

Other potential land use conflicts could occur along Transwestern Loop G, part of which would not be in conformance with the Coconino National Forest Plan. This conflict could be easily resolved by keeping Loop G north of the existing line in the vicinity of the Fort Valley Experimental Forest.

The System A route contains nine 25-mile long segments which have a high cultural resources sensitivity rating. Compliance procedures should provide adequate mitigation to potentially significant impacts.

Approximately 2,935 acres of significant paleontological formations would be crossed by the route. Since this figure indicates potentially significant areas, it is difficult to determine the exact amount of significant areas. Implementation of the mitigation measures in the document would reduce the potential impacts to paleontological resources to insignificance.

Approximately 318 acres of the route would cause potentially high visual impacts. These impacts would occur along portions of the route in the eastern Mojave Desert.

Potential safety concerns exist along various portions of the El Dorado primarily focused around Newberry Springs, Daggett and the city of Bakersfield. These safety concerns are not considered significant.

1.3.2 El Dorado System B: El Dorado, El Paso 400 MMcfd Alternative (100/300 Case), Northwest 100 MMcfd Case, and Transwestern

This four component system alternative would require construction of 775 miles of pipeline. The support facilities required to supply the El Dorado pipeline would be unchanged from those discussed for the Mojave System B (Section 1.2.2). This project could supply a maximum of 720 MMcfd of natural gas to the EOR/cogen market. This would leave a surplus of 200 MMcfd supply capacity at Topock.

This alternative action would not significantly affect air quality along the route in either construction or operation. Two new compressor stations would be required on the Northwest line with additions to the Green River and Ignacio Stations, as well as additional compression at the Bondad station on the El Paso line. These stations would meet all state and federal regulations.

The System B route would encounter at least 19 Quaternary surface faults, one more than the El Dorado System A route. Again, the potential for surface fault rupture would be greatest in the western portions of the El Dorado line. The route would also contain approximately 43 miles of potential landslide areas, 16 more miles than for System A. This route would also have 87 miles of slopes greater than 30 percent, five more miles than the System B route.

Approximately 4,489 acres of this route would occur in areas with soils with a poor reclamation potential. This represents 146 more than the System A route.

The El Dorado System B route would cross 71 intermittent and perennial streams, three more than the System A route. Only three perennial streams would be crossed by this route, the same as the System A route.

Groundwater impacts could occur along 15 miles of the route, the same as the System A route. Again, all impacts to groundwater should be mitigatable. Like the System A route, this routing would have no significant impacts to freshwater biology resources.

This routing system would temporarily disturb 8,599 acres of native vegetation. This is 50 more than the System A route. The route would also keep 1,838 acres of woody vegetation permanently cleared from the operational ROW, unchanged from the System A route. The route would also cross 24 acres of riparian habitat, the same as the previously described route.

The route has the potential to impact one federally threatened plant species and its habitat, the same as System A. This would represent 60 acres of federally listed plant species habitat, unchanged from System A. This alternative would have the same number of California state listed plants and the same mileage impacts as those discussed for the System A route.

This route would also temporarily disturb 525 acres of agricultural land, the same as the System A route. The alternative would also permanently remove the same number of acres of orchards and vineyards from production as System A.

The alternative El Dorado System B route would cross 748 acres of big game critical/high priority habitat, 121 acres of big game migration corridors, and 56 acres of fawning areas. The impacts would be the same as would occur on the System A route.

The route would also impact 9,119 acres of habitat of wildlife species of special concern, 300 more than System A. Table 1.3-1 shows the comparisons of all wildlife species of special concern. Significantly impacted species habitat would include that for the California condor, desert tortoise, black-footed ferret, and Mohave ground squirrel.

The construction workforce would place a significant but temporary demand on housing and campgrounds in areas of Wyoming, Arizona, New Mexico, and in San Bernardino County, California. Except for Wyoming and northwestern New Mexico, these would involve the same impacts as those identified under the System A proposal. Property tax revenues would increase more than ten percent in five counties crossed by the pipeline.

The alternative route would cause no significant impacts to traffic. Noise impacts on this line would be similar to those discussed above; however, since two new compressor stations would be required along with additional compression at the Bondad station, the route would create more permanent noise.

The System B route would have similar impacts to recreation areas and land use as those discussed for System A.

The System B route contains ten 25-mile long segments having a high cultural resources sensitivity rating, one more than the System A route.

Approximately 2,993 acres of significant paleontological formations would be crossed by the route. This is 58 more than the System A route.

Approximately 318 acres of significant visually high impacts would occur along the route, the same as for System A route.

Safety concerns along the System B route would remain the same as those discussed for System A.

1.3.3 El Dorado System C: El Dorado, El Paso 600 MMcfd Alternative (100/500 Case), and Northwest 100 MMcfd Case

This three component system alternative would require construction of 587 miles of pipeline. The support facilities required to supply the El Dorado pipeline would be unchanged from those discussed for the Mojave System C route (Section 1.2.3). This project would supply a maximum of 600 MMcfd of natural gas to the EOR/cogen market. This would make available a surplus of 80 MMcfd at Topock over that proposed by El Dorado in its application.

Air quality impact related to construction would be more than the System A route and similar to the System B route. The two new compressor stations and additional compression at three other stations would meet all applicable state and federal air quality regulations. Air quality concerns, therefore, would be similar to System B.

This system routing would encounter at least 16 Quaternary surface faults, two less than either System A or B. This route would have 80 miles of potential landslide areas, 53 more miles than the System A and 37 more miles than for the System B route. Approximately 57 miles of the route would be built in areas with slopes greater than 30 percent. This is 25 fewer miles of potential impact than the System A route and 30 fewer than the System B route.

Soils with potentially poor reclamation would occur on 3,052 acres of the System C route. This is 1,291 fewer acres than the System A route and 1,437 fewer than the System B route.

The alternative route would cross 61 intermittent and perennial streams, seven fewer than the System A route and ten fewer than the System B route. Three perennial streams would be crossed by this route, the same as Systems A and B.

Potential impacts to groundwater could occur along seven miles of the route, eight fewer miles than the System A and B routes. Like the System A and B routes, freshwater biology resources would not be significantly impacted by the route.

The System C route would temporarily disturb 6,697 acres of native vegetation. No portions of the route would affect unique or extremely sensitive vegetation types except for Joshua trees and cactus. This acreage figure is 1,852 and 1,902 fewer than would be impacted by either the System A or B routes respectively.

The alternative would keep 1,797 acres of woody vegetation permanently cleared from the operational ROW. This represents 41 fewer acres of permanent impact than the System A and B routes. Construction of the route would impact approximately 24 acres of riparian vegetation, the same as the System A and B routes.

This route would not impact any federally threatened or endangered plant species or plant species habitat. This is 60 fewer acres than the System A or B routes. The California state listed plant species and the number of miles of potential habitat for all three systems would remain the same.

This route would temporarily disturb 489 acres of agricultural land primarily along the El Dorado route. This is 36 fewer acres than either the System A or System B routes. The route would also permanently remove 273 acres of orchards and vineyards from production for the life of the project. This number remains unchanged from Systems A and B.

The alternative System C route would impact 564 acres of big game critical habitat, 184 fewer than either the System A or B routes. The impacts to big game migration corridors would be unchanged. No impacts to big game fawning areas would occur as opposed to 56 acres for either System A or B. Twenty-four acres of impacts to upland game bird sensitive habitat would occur as opposed to no impacts for either System A or B.

The alternative route would also impact 8,799 acres of wildlife habitat of species of special concern. This represents a decrease of 20 acres over the System A route and a 320 acre decrease from the System B route. Increases in acreage occur primarily with the desert tortoise habitat.

The construction workforce would place a significant but temporary demand on housing and campgrounds in areas of Wyoming, portions of Arizona and New Mexico, and San Bernardino County in California. These impacts would be essentially the same as either the System A or B routes, although impacts in Arizona and New Mexico may not be as severe since both El Paso and Transwestern workforces would not be in the area simultaneously. Property tax revenues would increase more than 10 percent in one county crossed by the pipeline.

Traffic and noise impacts would be similar to those discussed for System B. Recreational facilities impacts would be similar to those discussed for Systems A and B.

The alternative El Dorado System C route eliminates the land use conflicts with Golden Shores Subdivision, Havasu NWR, and BLM corridors in the Yuma District.

Portions of the westernmost 4.2 miles of the Flagstaff Loop would be in conflict with the Elden Environmental Study Area located within the Coconino National Forest. The conflicts associated with the Transwestern line concerning the Coconino National Forest Plan would be eliminated. The remainder of the land use problems would be the same as those discussed for the System A and B routes.

The System C route contains nine 25-mile long segments with a high cultural resources sensitivity rating, one less sensitive segment than System B and the same number as System A.

This route has the potential to impact 2,454 acres of significant paleontological formations. This is 481 and 539 fewer acres than the System A and B routes, respectively.

Visual impacts for the System C route remain unchanged from either the System A or B routes.

Safety concerns would also remain unchanged from either the System A or B routes.

1.3.4 El Dorado System D: El Dorado, El Paso 600 MMcfd Alternative (200/400 Case), and Northwest 200 MMcfd Case

This three component system alternative would require construction of 751 miles of pipeline. The support facilities required to supply the El Dorado pipeline would be unchanged from those discussed for the Mojave System D route (Section 1.2.4). This project would supply a maximum of 600 MMcfd of natural gas to the EOR/cogen market. This would make available a surplus of 80 MMcfd at Topock over that proposed by El Dorado in its application.

This alternative would not significantly affect air quality along the route for either construction or operation. The two new compressor stations and the additional compression at four other stations would meet all applicable state and federal air quality regulations. Air quality concerns, therefore, would remain unchanged from either Systems A, B, or C.

This system routing would encounter at least 17 Quaternary surface faults, one more than System C, one less than System A, and two fewer than System B. This route would have 179 miles of potential landslide areas, 152 more miles than the System A route, 136 miles more than the System B route and 99 more miles than the System C route. Approximately 82 miles of the route would be built in areas with slopes greater than 30 percent.

This is the same as for the System A route, five fewer miles than the System B route, and 25 more miles than the System C route.

Soils with potentially poor reclamation would occur on 3,632 acres of the System D route. This is 711 and 857 fewer than the System A and B routes, respectively. It also represents 580 more acres of disturbance than would occur on the System C route.

The route would cross 120 intermittent and perennial streams, 52, 49, and 59 more than the System A, B, and C routes, respectively. Fifteen perennial streams would be crossed by this route, twelve more than the other three systems. Nine highly significant perennial stream crossings would occur on the System D route as opposed to no sensitive stream crossings on any of the other El Dorado system routes.

Potential impacts to groundwater could occur along seven miles of the route, eight fewer miles than either the System A or B routes and the same number of miles as the System C route. Like the System A, B, and C routes, freshwater biology resources would not be significantly impacted by the route.

The System D route would temporarily disturb 8,604 acres of native vegetation. No portions of the route would affect unique or extremely sensitive vegetation types except for Joshua trees and cactus. This acreage is 55, 5, and 1,907 more than would be impacted by either the System A, B, or C routes, respectively.

The routing would keep 1,797 acres of woody vegetation permanently cleared from the operational ROW. This represents 41 fewer acres of permanent impact than the System A or B routes, and the same number of acres of disturbance as the System C route. Construction of the route would impact approximately 34 acres of riparian vegetation, ten more than any of the other systems.

This route could impact two federally threatened or endangered plant species or habitat. This is 75 more acres than the System C route and 15 more acres than either the System A or B routes. The California state listed plant species and the number of miles of potential habitat for all four systems would remain the same.

This route would temporarily disturb 673 acres of agricultural land primarily along the El Dorado route. This is 148 more acres than either the System A or B routes and 184 acres more than the System C route. Impacts to orchards and vineyards would remain unchanged.

The alternative System D route would impact 1,553 acres of big game critical habitat, 805 more than either the System A or B routes and 989 more than the System C route. The impacts to big game migration corridors would be unchanged. There would be no impacts to fawning areas, 56 acres less than for System A or B and the same as for System C. Impacts to upland game bird sensitive habitat could occur to 30 acres, 30 more than were identified for System A or B and six more than were identified for System C. The System D route would also impact two raptor nests, two more than any of the previous systems.

The alternative route would also impact 9,717 acres of wildlife habitat of species of special concern. This represents an increase of 898 acres over the System A route, an increase of 598 acres of System D, and an increase of 918 over the System C route. Increases in acreage occur primarily in desert tortoise and black-footed ferret habitat.

The construction workforce of System D would place a significant but temporary demand on housing and campgrounds in areas of Wyoming, Utah, Arizona, New Mexico and San Bernardino County in California. These impacts would be essentially the same as those discussed above, but since the workforce in Arizona would only be from El Paso rather than El Paso and Transwestern, the impacts would not be as severe as for Systems A or B. Property tax revenues would increase more than 10 percent in four counties crossed by the pipeline.

Traffic and noise impacts would remain essentially unchanged from those discussed for System C. Impacts to recreational facilities would remain essentially unchanged from those discussed for System B.

The El Dorado System D route would have the land use impacts discussed for System C. In addition, land use conflicts along the route include the problems associated with commercial and residential development along the Moab Loop and the proximity of the Cisco Loop to the Lost Springs WSA, on the Northwestern loops.

System D contains three 25-mile long segments with a very high cultural resources sensitivity and eleven 25-mile long segments with a high sensitivity rating. These sensitivity ratings are much higher than any of the other system routes.

This route has the potential to impact 3,309 acres of significant paleontological formations. This is 374, 316, and 855 more than the System A, B, and C routes, respectively.

Visual impacts for the System D route would be of concern at Arches National Park and Lost Springs WSA in addition to the area identified for Systems A, B, and C.

Safety concerns would remain essentially unchanged from those discussed for Systems A, B, and C.

1.3.5 El Dorado Alternative A

Alternative A would replace 73 miles of the El Dorado mainline between MP 37 and 110 in the eastern Mojave Desert. The Alternative A route is 2.4 miles longer than the proposed route and is similar to the Mojave mainline route.

Impacts to air quality, surface water, and freshwater biology would remain unchanged from the El Dorado proposed route.

The Alternative A route would have the same geological impact as the primary route except in the category of slope greater than 30 percent. The portion of the mainline route replaced by Alternative A has three miles of slope greater than 30 percent while the Alternative A route has no mileage in this category.

Alternative A would have 548 acres of impacts to soils with a poor reclamation potential compared with 457 acres for the portion of the mainline it would replace.

Alternative A would have no potential for impact to groundwater, the same as the portion of the route it would replace.

The El Dorado Alternative A route would increase impacts to total areas of native vegetation temporarily disturbed by 29. It would also increase impacts to acres of woody vegetation kept cleared for the life of the project by 15.

Neither the alternative nor the portion of the main route which would be avoided has the potential to affect riparian habitat, federally threatened or endangered plant species and the number of California state listed plant species or their habitat, agricultural land, big game critical habitat, big game migration corridors, upland game bird sensitive habitat, or raptor nesting.

The Alternative A route would have 27 more acres of impacts to wildlife habitats of species of special concern. This increase occurs within the habitat of the desert tortoise.

Socioeconomic, traffic, noise, and recreation impacts along the Alternative A route would be similar to those discussed for the proposed mainline.

The El Dorado Alternative A route would avoid the one potential land use conflict present in the primary routing, the proposed Mojave National Park immediately north of the proposed route.

The Alternative A route would not differ in the number of NRHP properties or in the amount of survey coverage. It has one segment with high sensitivity whereas the portion of the mainline it would replace has none. The Alternative has fewer sites in the direct impact zone.

The Alternative A route would contain 58 fewer acres of significant paleontological formations.

No visual impacts would be present on the Alternative A route, 318 fewer acres than on the portion of the mainline it would replace.

No additional system safety concerns were identified along the Alternative A route.

1.3.6 El Dorado Alternative B

Alternative B would replace 10 miles of the El Dorado mainline between MP 240 and 250. The Alternative B route is almost two miles shorter than the main route.

Impacts to air quality, surface water, groundwater, freshwater biology, socioeconomics, paleontology, and visual resources would remain unchanged from the El Dorado main route.

Impacts caused by surface fault rupture and landslide potential would remain unchanged; however, one less mile of slope greater than 30 percent would be present along the Alternative B route than would occur along the primary route.

Alternative B would impact 22 acres of soils with poor reclamation potential as opposed to 64 acres along the primary route.

The El Dorado Alternative B route would have 21 fewer acres of impacts to native vegetation than the main route and 16 fewer acres of impacts to woody vegetation permanently removed from the operational ROW.

Neither Alternative B nor the portion of the primary route avoided would have an effect on riparian habitat, federal and California state listed threatened or endangered plant species or their habitat, agricultural lands, or general wildlife (see Table 1.3-1). The alternative would have 20 fewer acres of impacts to California condor habitat and three acres more impact to Tehachapi slender salamander habitat, both species of special concern.

The El Dorado Alternative B route would have one additional land use conflict which was not present in the primary route. The Alternative B route would cause impacts to the Bear Valley Springs community, particularly to the existing residential area and to future development.

The Alternative B route contains no known cultural resource sites, two fewer than the portion of the mainline it would replace. No NRHP properties would be affected by either of the routes. Survey coverage for both routes is roughly equivalent and no high sensitivity segments are present.

Safety concerns may be slightly greater than for the portion of the mainline since Alternative B goes through the Bear Valley Springs subdivision.

1.3.7 El Dorado Alternative C

Alternative C would depart from the mainline route at approximately MP 247 at the western end of the Cummings Valley. It would traverse mountain valleys and ridges, descend the Tehachapi Mountains, and rejoin the proposed mainline at MP 256. The Alternative C route is approximately 3.3 miles shorter than the proposed route.

Impacts to air quality, surface water, groundwater, freshwater biology, socioeconomics, land use, paleontology, and visual resources would remain unchanged from the primary route.

Impacts along the Alternative C route with regard to surface fault rupture and landslide potentials would remain unchanged from the primary route. Alternative C, however, does have four fewer miles of slopes greater than 30 percent than the portion of the mainline it would replace.

Alternative C would impact 41 acres of soils with poor reclamation potential, 32 fewer than the portion of the mainline it would replace.

This routing alternative would impact 53 fewer acres of native vegetation and 11 fewer acres of permanently cleared woody vegetation than on the portion of the mainline it would replace.

Acres of riparian habitat crossed and the numbers and associated habitat of federally threatened or endangered plants would remain unchanged from the main route. California state listed plant species would also remain unchanged. Impacts to agricultural lands would increase by 12 acres when compared to the portion of the mainline it would replace.

The Alternative C route would have no changes in the amount of impacts caused to general wildlife species. The route would impact 41 fewer acres of California condor habitat; however, there is an increase of 56 acres in San Joaquin kit fox habitat and a three acre increase in Tehachapi slender salamander habitat.

One more cultural resource site would be encountered on Alternative C than would occur on the primary route. Alternative C, however, has been surveyed at the 71.4 percent level, much higher than the proposed route. No NRHP properties have been identified on either route and no high sensitivity rating segments are present.

No new safety concerns were identified along this Alternative.

1.3.8 The El Dorado Alternative Best Case

Based on the above discussion, the route with the least environmental impact is the El Dorado previously proposed route. Differences between the primary route, Alternative A and Alternative C are so minor that no preference need be assigned. On the other hand Alternative B would unnecessarily affect established development in Bear Valley Springs with no substantial offsetting gains.

The selection of the best system to supply El Dorado is based on precisely the same factors used for Mojave since the supplying projects are identical. Consequently the El Dorado System C would be preferable to the other systems.

1.4 KERN RIVER PROPOSED ACTION

Kern River Gas Transmission Company (Kern River) proposes to construct, own, and operate an interstate natural gas transmission pipeline from Opal, Wyoming, to Kern County, California. The proposed Kern River system would be approximately 831 miles long. Three components make up the Kern River system: the 756-mile long mainline and the Kern River (27 miles) and Taft (48 miles) Laterals.

Kern River proposes to provide the capacity to transport up to 700 MMcfd of natural gas from two major existing sources: the Overthrust Belt gas fields in southwest Wyoming and northeast Utah, and the western Canadian gas fields. Canadian gas would be received at the border and transported through the existing Northwest system from Sumas, Washington, to southwest Wyoming where it would be delivered to Kern River near Opal. No new facilities would be required by Northwest to transport this gas. Overthrust gas would be collected from fields adjacent to Kern River's proposed mainline.

In addition to Kern River's proposed route, six variations are examined in this document. The Kern River Proposal and the variations are outlined below with the major impacts discussed. Table 1.4-1 compares impacts associated with the Kern River proposal and its alternatives.

1.4.1 Kern River Proposal

The Kern River system would interconnect with Northwest's interstate transmission system near Opal, Wyoming, traverse 15 counties in four states, and terminate in the Bakersfield, California, area. Three compressor stations providing a total of 35,500 hp would be constructed as part of the project. The route would follow existing utility and transportation corridors for approximately 54 percent of its length.

Table 1.4-1

KERN RIVER SUMMARY OF IMPACTS 1/

	Kern River Proposed	Wasatch Variation	West Strawberry Variation	Salt Creek Canyon Variation	North Las Vegas Variation	Henderson Variation	North Bakersfield Variation
AIR QUALITY	NSI 2/	NSI	NSI	NSI	NSI	NSI	NSI
GEOLOGY							
Surface fault rupture	23	2 (1)	0 (0)	1 (1)	1 (2)	0 (0)	4 (6)
Miles of landslide potential	163	42 (69)	15 (38)	4 (8)	0 (0)	0 (0)	10 (2)
Miles of slope greater than 30%	229	44 (61)	23 (42)	0 (6)	8 (5)	0 (0)	29 (10)
SOIL							
Acres of poor reclamation potential	4882	703 (1570)	218 (812)	60 (60)	1236 (927)	170 (121)	242 (160)
SURFACE WATER							
Number of stream crossings	135	46 (40)	20 (20)	1 (7)	9 (12)	15 (2)	21 (11)
Intermittent stream crossings	83	30 (10)	4 (2)	0 (4)	7 (8)	15 (2)	20 (10)
Perennial stream crossings	52	16 (30)	16 (18)	1 (3)	2 (4)	0 (0)	1 (1)
Moderate/high significance perennial stream crossings	39	12 (24)	11 (15)	0 (3)	0 (0)	0 (0)	0 (0)
GROUNDWATER							
Miles of potential impact	10	4 (2)	(10) (0)	0 (1)	0 (1)	1 (1)	0 (0)
FRESHWATER BIOLOGY							
Number of sensitive stream crossings with fish present	13	6 (12)	3 (7)	1 (2)	0 (0)	0 (0)	0 (0)
TERRESTRIAL BIOLOGY							
Vegetation							
Total acres of native vegetation temporarily disturbed	8646	1370 (1438)	756 (691)	25 (116)	1320 (1162)	190 (141)	1000 (654)
Acres of woody vegetation kept cleared for the life of the project	2920	599 (612)	285 (295)	12 (45)	665 (544)	95 (24)	210 (98)
Acres of riparian habitat crossed	98	125 (61)	105 (25)	0 (0)	10 (24)	0 (0)	10 (13)

Table 1.4-1 (continued)
KERN RIVER SUMMARY OF IMPACTS 1/

	Kern River Proposed	Wasatch Variation	West Strawberry Variation	Salt Creek Canyon Variation	North Las Vegas Variation	Henderson Variation	North Bakersfield Variation
Vegetation (continued)							
Acres of federally threatened or endangered plant habitat affected	0	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Number of species	0	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Acres of California classified plant species affected	536	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	82 (41)
Number of species	4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
Acres of agricultural land temporarily disturbed	1561	425 (138)	24 (24)	145 (78)	0 (2)	0 (0)	350 (353)
Wildlife							
Big game crucial or high priority habitat (acres)	1350	493 (688)	396 (397)	12 (75)	0 (0)	0 (0)	0 (0)
Big game migration corridor (acres)	162	0 (77)	0 (0)	0 (0)	0 (37)	0 (0)	0 (0)
Big game fawning/calving area (acres)	0	0 (0)	50 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Upland game bird sensitive habitat (acres)	404	24 (0)	164 (40)	0 (0)	0 (0)	0 (0)	0 (0)
Waterfowl critical nesting areas (acres)	60	22 (36)	0 (0)	0 (36)	0 (0)	0 (0)	0 (0)
Raptor nesting areas (nests)	12	7 (4)	16 (4)	2 (0)	0 (0)	0 (0)	0 (0)
Acres of potential threatened or endangered animal habitat	8404	185 (18)	0 (0)	12 (0)	424 (454)	0 (0)	3293 (2607)
Yuma clapper rail	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bald eagle	121	65 (18)	0 (0)	12 (0)	0 (0)	0 (0)	0 (0)
Peregrine falcon	0	120 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Whooping crane	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
California condor	1560	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1680 (1141)

Table 1.4-1 (continued)
KERN RIVER SUMMARY OF IMPACTS 1/

	Kern River Proposed	Wasatch Variation	West Strawberry Variation	Salt Creek Canyon Variation	North Las Vegas Variation	Henderson Variation	North Bakersfield Variation
Wildlife (continued)							
Blunt-nosed leopard lizard	339	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	217 (279)
Tehachapi slender salamander	3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9 (3)
Desert tortoise	3716	0 (0)	0 (0)	0 (0)	424 (303)	0 (0)	0 (0)
San Joaquin kit fox	333	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	424 (403)
Black-footed ferret	600	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Utah prairie dog	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mohave ground squirrel	751	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nelson's antelope squirrel	290	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	292 (290)
Tipton kangaroo rat	24	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	12 (24)
Short-nosed kangaroo rat	290	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	424 (290)
Giant kangaroo rat	177	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	235 (177)
SOCIOECONOMICS							
Population change >10%	No	No	No	No	No	No	No
Total employment change >10%	No	No	No	No	No	No	No
Income change >10%	No	No	No	No	No	No	No
Vacancy rates of temporary housing <5%	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local tax base change >10%	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Traffic	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Operational noise	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Recreation (conflicts)	6	2 (1)	1 (1)	0 (0)	1 (3)	0 (0)	0 (0)

Table 1.4-1 (continued)
KERN RIVER SUMMARY OF IMPACTS 1/

	Kern River Proposed	Wasatch Variation	West Strawberry Variation	Salt Creek Canyon Variation	North Las Vegas Variation	Henderson Variation	North Bakersfield Variation
LAND USE/OWNERSHIP							
Number of conflicts	5	2 (1)	2 (1)	0 (0)	0 (4)	0 (1)	0 (0)
CULTURAL RESOURCES							
Number of sites in the direct impact zone	77	5 (2)	1 (2)	0 (0)	6 (5)	0 (0)	4 (5)
NRHP listed or eligible sites in the direct impact zone	4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Percentage of line actually surveyed	5	1 (1)	0 (0)	0 (0)	17 (12)	9 (11)	8 (7)
High sensitivity segments	9	0 (0)	0 (0)	1 (0)	1 (1)	0 (0)	0 (1)
PALEONTOLOGIC RESOURCES							
Acres of impact to significant formations	6119	1716 (776)	602 (447)	0 (0)	1305 (1124)	185 (194)	556 (45)
VISUAL RESOURCES							
Acres of high visual impact	470	28 (186)	257 (114)	0 (0)	0 (76)	0 (0)	0 (0)

1/ The first entry for each resource under route variations represents the value for the variation segment only; the value in parenthesis represents the comparable quanity for the portion of the proposed route which would be avoided by using this variation.

2/ NSI = No Significant Impact

The proposed action would not significantly affect air quality along the route during either construction or operation. Construction impacts to air quality would represent a temporary source of both dust and engine emissions. Operation of the three new compressor stations located in Wyoming, Utah, and Nevada would meet all applicable state and federal regulations. Air quality changes in Kern County resulting from project implementation would be positive.

The proposed route would encounter at least 23 Quaternary surface faults. The potential for surface fault ruptures would be greatest in the western portions of the route in California and the central Utah portion of the route. Pipeline design criteria would adequately mitigate potential hazards due to surface fault ruptures.

The pipeline route would cross approximately 163 miles of potential landslide areas. The majority of the potential landslide areas would occur between MP 59 and 186. In addition to the miles of landslide potential, 229 miles of the route would be constructed in areas with a slope greater than 30 percent. These areas are again concentrated along the mountainous portions of the Kern River route in north-central Utah and the Tehachapi Mountains portion of the route in southern California.

The proposed route would cross approximately 4,882 acres of land in areas with soils having poor reclamation potential. These areas are located primarily in the Mojave Desert geographic region in California (MP 535 to 713), although impacts in the Middle Rocky Mountains (MP 70 to 185) and Basin and Range (MP 185 to 535) areas of Utah and Nevada would also be significant. Implementation of erosion control, restoration, and revegetation guidelines would help to stabilize many of the areas. The Mojave Desert region, due to low rainfall, may take many years before vegetation would be adequately recovered. Similar problems with revegetation may occur in the Middle Rocky Mountains region primarily due to steep slopes, although well-designed erosion control plans should alleviate most of the problems.

The proposed route would cross 135 intermittent and perennial streams. A total of 52 perennial stream crossings would be necessary. Thirty-nine of these stream crossings would have moderate to high significance due to channel gradient, stream bed characteristics, and sideslope. Even if mitigation measures were applied, it is likely that some level of increased sediment loading would continue for a period after construction was completed. The largest number of these sensitive stream crossings would occur in the Middle Rocky Mountains region.

There would be approximately 10 miles of high and medium potential impacts to groundwater resources along the proposed route. These impacts would be distributed within the Wasatch and Tehachapi Mountains, Mojave River Valley, and Las Vegas Valley.

It is unlikely that impacts to groundwater would be significant if the mitigation measures outlined are adhered to.

The Kern River proposed route would have significant impacts to 13 stream crossings in terms of freshwater biology. Principal impacts on aquatic environments would result from construction and include increased sedimentation, substrate removal, and habitat alteration. All of the sensitive stream crossings would occur in the Middle Rocky Mountains region between MP 44-185. Mitigation measures which reduce the amount of sediments introduced to the streams and avoid critical fish spawning times could greatly reduce the amount of overall impact.

The proposed route would temporarily disturb 8,646 acres of native vegetation and may impact the blackbrush scrub and the lowland saltbush scrub communities. The blackbrush scrub vegetation type represents a select community which may be impossible to revegetate to pre-construction conditions. In addition to these communities, Joshua trees and cactus which are scattered in the creosote and saltbush vegetation types may also be adversely affected. The proposed route would keep 2,920 acres of woody vegetation permanently cleared from the operational ROW. Due to the low revegetative potential along many portions of the proposed route, woody plant species may not reoccur for well over 50 years. Construction of the pipeline would also impact approximately 98 acres of riparian habitat.

The proposed route would impact no federally threatened or endangered plant species. However, four California state listed plant species could be impacted. This plant habitat occurs along 536 acres of the route.

In addition to the impacts to native vegetation, the proposed route would temporarily disturb 1,561 acres of agricultural land, primarily in the Basin and Range region and the San Joaquin Valley. These impacts would not last beyond one agricultural season. The route would also remove 242 acres of orchards and vineyards from production in the San Joaquin Valley for the life of the project.

The proposed route would significantly impact 1,350 acres of big game crucial or high priority habitat primarily between MP 0 and 390. The route would also affect 162 acres of big game migration corridors primarily in the Middle Rocky Mountains region. Approximately 404 acres of sensitive upland game bird habitat would be impacted by the proposed action particularly in the Basin and Range and Mojave Desert areas.

Sixty acres of crucial waterfowl nesting areas would be impacted in the Basin and Range area. A total of 12 known raptor nests along the route could be significantly affected.

In addition to impacts to wildlife, 8,404 acres of potential habitat of threatened or endangered wildlife species would be adversely affected including the California condor (1,560 acres), black-footed ferret (600 acres), Mohave ground squirrel (751 acres), and desert tortoise (3,716 acres). Table 1.4-1 lists habitat acreages suitable for other species of special concern which would be impacted.

The Kern River construction workforce would place a significant but temporary demand on housing and campgrounds in areas of central and southern Utah, southern Nevada, and San Bernardino County in California. This would inconvenience travelers and campers seeking accommodations if the construction period occurred during the tourist season. Property tax assessed values would increase more than 10 percent in seven counties crossed by the pipeline. Positive although not significant changes in total employment and overall income would also occur as a result of construction.

The proposed route would have no significant impacts to traffic since major roads along the route would be crossed by boring beneath paved roads. Noise impacts caused by construction would be temporary in nature and would only occur during working hours. Since the majority of the proposed route would be constructed in relatively uninhabited areas, noise resulting from construction would not present a significant problem. Noise resulting from compressor station operation is expected to be below an Ldn of 55 dBA at nearby noise sensitive areas.

There is no vehicle access into most of the mainline route from MP 110 to 142. New roads would have to be approved by the Forest Service prior to construction. In several areas, new roads would cause unavoidable adverse impacts to soils, land stability, and other watershed values. The Forest Service may deny approval of new roads in these areas and specify helicopter supported construction.

The proposed route would conflict with the operation of six recreation areas. Most of these impacts would be temporary in nature. Construction activities could adversely affect competition for camping space in developed campgrounds in the Wasatch-Cache and Uinta National Forests, particularly if construction takes place between May and October. There would also be impacts to the Sunrise Mountain Natural Area, Rainbow Gardens, and the proposed Clark County Wetlands Park on the Las Vegas Wash during the construction period in the form of increased traffic, vegetation disturbance, water quality degradation, and disruption of the natural visual quality. While most of these impacts are expected to be short-term, and in the instance of the Wetlands Park may occur prior to park development, visual disruption and the loss of any unique geologic/topographic feature within the ROW in the Rainbow Gardens area would be permanent. Finally, the Pacific Crest National Scenic Trail would experience temporary disturbance during construction in the form of interruption or delay of traffic, disturbance of vegetation and soils, and disruption of the natural visual quality.

The proposed action would conflict with the Utility Corridor Rule as presented in the Forest Land and Resource Management Plan for the Uinta National Forest. Construction along the proposed route would violate the intent of the plan in designating lands suitable for utility corridors. Another significant conflict would occur with the Sunrise Mountain Natural Area because BLM cannot issue a ROW grant for an activity which would permanently alter this area. Until this area (which is not recommended for Wilderness status) has been formally removed from the list, an unavoidable land use conflict would occur.

While direct construction impacts to the Rainbow Gardens area would be both short and potentially long-term, the longer term implications of facilitating access to the area are of substantial concern. Given the potential to accelerate degradation of the area, this impact is considered significant.

The proposed action is not in compliance with the Master Plan for the proposed Clark County Wetlands Park. The route would also conflict with the land use plan for the city of Henderson, Nevada.

The Kern River route would encounter two 25-mile long segments with a very high cultural resources sensitivity rating and seven segments with a high sensitivity rating. Compliance procedures, however, should provide adequate mitigation to potential impacts.

Approximately 6,119 acres of significant paleontological formations would be crossed by the proposed route. Implementation of the mitigation measures in this document would reduce the potential impacts to paleontological resources to insignificance.

Approximately 470 acres of the route would have highly significant impacts to visual quality. The majority of these impacts would occur in the Uinta National Forest; the remainder are dispersed along the route.

Safety concerns along the route would be confined to some residential areas of Henderson and near East Las Vegas, Nevada; Tehachapi, Brite Valley, Lamont and Bakersfield, California. With proper mitigation, these safety concerns should not be significant.

1.4.2 Kern River Wasatch Variation

The Kern River route with the Wasatch Variation would entail construction of 854 miles of pipeline. The Wasatch Variation would avoid crossing approximately 100 miles of rugged, mountainous terrain which would be traversed by the proposed route.

It also avoids crossing the Uinta National Forest. The variation is approximately 154 miles in length versus 131 miles along the portion of the proposed route it would replace. The variation diverges from the proposed route at approximately MP 73 and would rejoin at MP 204.

Wasatch Variation impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; orchards and vineyards permanently removed; traffic and noise; number of high cultural resource sensitivity segments; federally threatened or endangered plant species; and California state listed plant species.

This variation would encounter the Wasatch Fault in a potentially more hazardous location than the proposed route. Also, an additional area of faulting (the West Valley Fault Zone) would be crossed by the Wasatch Variation. The variation would cross 42 miles of areas with potential landslide activity, as opposed to 69 miles for the portion of the route it would replace. The reduction in mileage of potential landslide activity that this variation offers would substantially improve the proposed action and was considered one of several key reasons for recommending its adoption.

The variation would also impact 44 miles of land containing slopes greater than 30 percent, compared to 61 miles along the portion of the route it replaces.

The Wasatch Variation would cross 703 acres of soils having poor reclamation potential, 867 fewer than the proposed portion of the route.

The Wasatch Variation would encounter 46 stream crossings, an increase of six over the portion of the mainline it would replace. This increase primarily occurs to intermittent stream crossings, where 20 additional crossings were encountered. Impacts to perennial streams would decrease to 16 from the 30 identified along the proposed route. Impacts to perennial streams with moderate to high significance also decreased to 12, 12 fewer than the proposed route portion. Although there would be a reduction in the number of streams impacted, the magnitude of unavoidable adverse impacts would be greatest in this variation because of municipal watersheds and adjacent urban populations. Nevertheless, the reduction in perennial stream crossings (and the concurrent improvement to freshwater biology discussed below) favors adoption of this variation.

Groundwater impacts along the Wasatch Variation would occur along four miles in the Wasatch Mountains, about two miles more than the portion of the proposed route it would replace. This difference is not considered significant.

Impacts to freshwater biology with regard to the number of sensitive stream crossings containing fish would decrease by six to a total of six significant stream crossings if this variation were adopted.

Approximately 1,370 acres of native vegetation would be temporarily disturbed on the Wasatch Variation, 168 fewer than would be impacted by the proposed action. Further, the variation would permanently remove 599 acres of woody vegetation. This is 13 fewer than the proposed action.

This variation would potentially impact 125 acres of riparian habitat compared to 61 acres on the portion of the proposed route it would replace. This is a significant disadvantage. The variation would also temporarily disturb 425 acres of agricultural land, 287 more than the proposed route segment.

The variation would significantly impact 493 acres of big game critical or high priority habitat versus 688 along the proposed route. The variation would affect no big game migration corridors, as opposed to the 77 acres which would be impacted by the proposed route. Approximately 24 acres of upland game bird sensitive habitat would be affected by the variation. This is 24 more acres than the proposed action. Twenty-two acres of critical waterfowl nesting areas would be affected by the variation, 14 fewer than the proposed route. A total of seven known raptor nests would be impacted by the variation, three more than the proposed route.

Approximately 185 acres of potential habitat of federal threatened or endangered wildlife species would be affected by the variation. This is 167 more than the proposed route. These 185 acres would affect bald eagle winter concentration areas and peregrine falcon hunting territory.

Impacts to socioeconomics would be similar to those discussed for the proposed action, although different counties in Utah would be involved. This variation is essentially unroaded for about 33 miles between the crossing of I-80 and its descent into the Salt Lake Valley. The four-mile portion of the Wasatch Variation within the Wasatch-Cache National Forest is inaccessible by vehicle. New roads would have to be approved by the Forest Service prior to construction. In several areas of steep rugged terrain, new roads would cause unavoidable adverse impacts to soils, land stability, and other watershed values. The Forest Service may deny approval of new roads in these areas and specify helicopter supported construction. Because these impacts could also occur along the replaced portion of the mainline in the Uinta Forest, the variation is favored.

Impacts to recreation facilities would be similar to the proposed action although impacts to campgrounds in the Uinta National Forest would not occur. These areas would be replaced by impacts to the developed picnic area at Mueller Park. These impacts would be confined to the construction phase.

Use of the Wasatch Variation would resolve the major institutional problem which faced the Kern River proposal from the beginning, i.e., routing in a north-south direction across the Uinta National Forest. This problem is manifested in the Uinta's Standards and Guidelines for Utility Corridors (Standards and Guidelines). While adoption of the variation would resolve the conflict with the Uinta's Standards and Guidelines, it would create a similar conflict with the Standards and Guidelines for the Wasatch-Cache National Forest. While this may not appear as a significant improvement, the Wasatch-Cache Forest Service staff have expressed optimism and demonstrated a willingness to work with Kern River to resolve conflicts with its Standards and Guidelines, with the goal of defining a route across the Wasatch-Cache. Although the Uinta National Forest has worked with Kern River, it has also steadfastly maintained its position that a crossing of the Forest cannot be reconciled with its Standards and Guidelines. While the remaining land use conflicts associated with the proposed route would still be applicable, avoidance of the Uinta National Forest tremendously favors adoption of this variation.

No high sensitivity cultural resource segments are present in either the variation or the replaced portion of the route.

The variation has the potential to impact 1,716 acres of land containing significant paleontological formations. This is 940 more than the proposed route. While this is a disadvantage, it is considered minor because mitigation for this resource is typically highly successful.

The Wasatch Variation would have 28 acres of high significance impacts to visual resources as opposed to the 186 acres along the proposed route it would replace. This factor highly favors adoption of the variation.

The Wasatch Variation would have significantly greater safety concerns due to the proximity of the large population centers associated with the greater Salt Lake region of Utah. Safety concerns include areas of Bountiful City, North Salt Lake, and West Valley City, where potential pipeline rupture could cause significant damage. The likelihood of such an occurrence happening is remote. The other safety concerns revolve around landslides and mudflows which could occur. These activities, which have occurred in the past in Bountiful City, could have a direct effect upon certain limited residential areas. The effects on water supplies could have wider ranging impact to Bountiful City and North Salt Lake residents in general. Again, mitigation measures concerning slope stability and surface water and groundwater should greatly reduce the potential for adverse impact.

1.4.3 Kern River West Strawberry Variation

The Kern River route with the West Strawberry Variation would involve construction of 838 miles of new pipeline. The West Strawberry Variation was identified as an alternative to construction in some of the same rugged terrain avoided by the Wasatch Variation. The variation would add about seven miles to the 57-mile long segment of the proposed route it replaces between MP 119 and 176.

West Strawberry Variation impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; number of surface faults; overall number of stream crossings; acres of agricultural land temporarily disturbed; acres of big game migration corridors and waterfowl critical nesting areas; acres of threatened or endangered wildlife species habitat; socioeconomics, traffic, and noise; and the number of high sensitivity cultural resource segments.

The variation would cross 15 miles of area with significant landslide potential. This is 23 fewer miles than the portion of the route it would replace. Very significant landslide potential, however, exists along four miles of the West Strawberry Variation and stringent mitigation measures to prevent slides must be adhered to. The variation would also impact 23 miles of land containing slope greater than 30 percent. These areas are indicative of slope stability and revegetation problems. This is 19 fewer miles than the proposed route segment.

The variation would impact 218 acres of soils with a poor potential for reclamation. This would be 594 fewer of disturbance than the proposed Kern River route it would replace.

The number of intermittent stream crossings would increase by two over the proposed action. However, moderate to high significance stream crossings would decrease by four.

High to medium potential groundwater impacts along the West Strawberry Variation would increase about 10 miles. No high to medium groundwater impacts occur along the portion of the proposed route which it would replace.

Impacts to freshwater biology with regard to the number of sensitive stream crossings would decrease by four, resulting in three significant stream crossings. All three streams contain Class B fisheries.

The variation would temporarily disturb 756 acres of native vegetation, 65 more than the proposed route. The variation, however, would impact 10 fewer acres of woody vegetation which would be permanently removed for the life of the project. The variation would impact 285 acres versus the 295 for the proposed action. The variation would potentially impact 105 acres of riparian habitat as opposed to 25 along the proposed route. The West Strawberry Variation would potentially impact one federally listed endangered plant species as opposed to none on the proposed route segment. It would impact one acre of federally listed plant species habitat, one more acre than the proposed route.

The variation would significantly impact 396 acres of big game critical or high priority habitat versus the 397 along the proposed route. The West Strawberry Variation would impact 50 acres of big game fawning/calving areas and 164 acres of upland game bird sensitive habitat compared to 0 and 40 acres, respectively, associated with the proposed route. Sixteen raptor nesting areas have been identified along the variation, 12 more than the portion of the proposed route it would replace.

Impacts to recreational facilities would be similar to those discussed for the proposed route. The recreation complex on the west side of Strawberry Reservoir would receive temporary impact during construction in the form of increased noise, traffic delays, and competition for camping space in the designated campground near the reservoir. Construction activities could also conflict with hunter usage.

The West Strawberry Variation would cause the same types of land use conflicts as were discussed for the proposed action. The variation itself is not within an existing utility corridor where it traverses the Uinta and Manti-LaSal National Forests and conflicts with rules for placement of utility corridors.

New roads on Forest Service lands would require approval by the Forest Service. In several areas on steep rugged terrain, new roads would cause unavoidable adverse impacts to soils, land stability, and other watershed values. The Forest Service may deny approval of new roads in these areas and specify helicopter supported construction.

The Kern River route with the West Strawberry Variation has the potential to impact 602 acres of land containing significant paleontological formations. This is 155 acres more than would be impacted in the proposed route.

The West Strawberry Variation has the potential to have 257 acres of significant visual impacts, 143 more than the portion of the route it would replace.

System safety concerns would be similar to those found along the portion of the mainline which the West Strawberry Variation would replace.

1.4.4 Kern River Salt Creek Canyon Variation

The Kern River route with the Salt Creek Canyon Variation would involve construction of 833 miles of pipeline. The variation was developed as a canyon/valley construction alternative to Kern River's proposed crossing of the northern tip of the San Pitch Mountains. The variation is 14 miles long versus 12 miles along the portion of the proposed route which it would replace. The variation is located between MP 180 and 192.

Salt Creek Canyon Variation impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; number of surface faults; acres of poor reclamation potential soils; groundwater; acres of riparian habitat; acres of big game migration corridors and habitat for sensitive upland game birds; socioeconomics, traffic, noise and recreation; land use; cultural and paleontological resources; and visual resources.

The variation would cross four miles of land with significant landslide potential, compared with eight encountered on the proposed route. The variation would not impact any land containing slopes greater than 30 percent, which are indicative of slope stability and revegetation problems. This figure is six miles less than would occur along the proposed route.

Surface water impacts caused by crossing intermittent and perennial streams would occur once; six fewer than the proposed route segment. Two fewer perennial streams would be crossed and three fewer significant stream crossings would occur.

Impacts to freshwater biology with regard to the number of sensitive stream crossings would occur one time compared with two.

The Salt Creek Canyon Variation would temporarily disturb 25 acres of native vegetation, 91 fewer than the proposed action. The variation would also permanently remove 12 acres of woody vegetation from the operational ROW for the life of the project. This is 33 fewer than the proposed route. The variation would temporarily impact 145 acres of cropland, 67 more than the proposed route.

The Salt Creek Canyon Variation would significantly impact 12 acres of big game critical or high priority habitat versus 75 acres along the proposed route.

No critical nesting areas for waterfowl would be impacted by the variation as opposed to the 36 acres impacted by the portion of the replaced proposed route. Two raptor nesting areas were identified within the Salt Creek Canyon Variation, compared to none along the proposed route.

A bald eagle winter roost was identified within the Salt Creek Canyon Variation which accounts for the increase of 12 acres in threatened or endangered animal habitat.

The Salt Creek Canyon route would contain one 25-mile long segment with a high cultural resources sensitivity rating. Compliance procedures, however, should provide adequate mitigation to potential impacts.

1.4.5 Kern River North Las Vegas Variation

The Kern River route with the North Las Vegas Variation would involve 844 miles of pipeline construction. The variation was developed as an alternative to crossing the Sunrise Mountain Natural Area, Rainbow Gardens, and Las Vegas Wash. This variation utilizing the Goodsprings Spur would require 109 miles of pipeline compared to 96 miles from the corresponding segment of the proposed route. The variation would depart the proposed route at MP 438 and rejoin it at MP 534.

North Las Vegas Variation impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; number of surface faults; plant species of special concern and their habitat; agricultural lands; big game critical habitat; upland game bird sensitive and waterfowl critical nesting habitat; number of raptor nests; freshwater biology; socioeconomics, traffic, and noise; and cultural resources.

The North Las Vegas Variation would cross eight miles of land with slope greater than 30 percent, three more than would occur along the proposed route.

The variation would impact 1,236 acres of soils with a poor potential for reclamation. This is 309 acres more than would occur along the proposed route and is directly attributable to the differences in mileage between the variation and the proposed route since reclamation potential in Nevada is generally poor.

Surface water impacts would decrease by three with nine stream crossings on the variation as opposed to twelve along the segment of the route it would replace. These crossings would occur on intermittent streams only.

The one mile of high potential groundwater impacts associated with the proposed route near Las Vegas Wash would be avoided.

The variation would temporarily disturb 1,320 acres of native vegetation, 158 more than would occur on the proposed route. One hundred twenty-one additional acres of woody vegetation would be disturbed on the North Las Vegas Variation and 14 fewer acres of riparian habitat would be impacted. Temporary impacts to agricultural land would be similar to those discussed for the proposed action with two fewer acres disturbed.

No big game migration corridors would occur along the variation, compared with 37 acres of migration corridors along the proposed route section it would replace.

The variation could potentially impact 424 acres of habitat for federally threatened and endangered wildlife species, 121 more acres than the proposed action. These 121 more acres of impacts would occur to desert tortoise habitat.

Impacts to recreational facilities would be reduced compared to those discussed for the proposed action. While the variation would have both long and short-term impacts to Off-Road Vehicle Recreation Area 13 near Goodsprings, this impact would replace those associated with the Rainbow Gardens, Sunrise Mountain Natural Area, and the proposed Clark County Wetlands Park on the proposed route. This reduction in impact potential significantly favors adoption of the variation.

Utilization of the North Las Vegas Variation would avoid the land use conflicts associated with the Sunrise Mountain Natural Area, the proposed Clark County Wetlands Park, and the Henderson land use plan. As has been identified in FEIR/S, II, conflict with the Sunrise Mountain Natural Area is at present insurmountable. At the present time, Kern River could not, under any circumstances, legally construct across this area. The North Las Vegas Variation, however, could impact Nellis AFB. Use of the North Las Vegas Variation would also avoid Rainbow Gardens as well as avoid crossing the Las Vegas Wash. These factors again favor adoption of the variation.

The North Las Vegas Variation has the potential to impact 1,305 acres of significant paleontological formations. This is 181 acres more impact than would occur along the proposed route.

Impacts to visual resources would be reduced by 76 acres because this variation would avoid construction through the Rainbow Gardens and the Las Vegas Wash areas. This factor favors adoption of this variation.

The North Las Vegas Variation would avoid some of the safety concerns associated with Henderson and East Las Vegas, however, the variation would pass through the Husite development as well as residential areas of North Las Vegas.

1.4.6 Kern River Henderson Variation

The Kern River route with the Henderson Variation would require approximately 833 miles of new pipeline construction. The Henderson Variation was developed to minimize impacts to large areas of undeveloped, subdivided tracts within the corporate limits of the City of Henderson, Nevada. The variation would parallel existing roads along its entire route. Total length of the variation is 15 miles, approximately two miles longer than the portion of the proposed route which it would replace. The variation would depart from the proposed route at MP 496 and rejoin it at MP 511.

Henderson Variations impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; surface faults, miles of landslide potential, and miles of slope greater than 30 percent crossed; high significance perennial stream crossings; freshwater biology; riparian habitat; agricultural lands; all wildlife habitat criteria; socioeconomics, traffic and noise; cultural and paleontological resources; visual resources; and system safety.

This variation would impact 170 acres of soils with a poor reclamation potential. This is an increase of 49 acres of disturbance over the proposed route.

Groundwater impacts along the Henderson Variation would increase by 14 miles from the one mile of potential impact that it would replace along the proposed route.

No impacts to perennial streams would occur on the variation. Approximately 15 intermittent streams would be crossed, 13 more streams than the proposed action.

The variation would temporarily disturb 190 acres of native vegetation, 49 more acres than would be disturbed by the proposed route. Approximately 95 acres of woody vegetation would be permanently cleared from the operational ROW. This is 71 acres more disturbance to woody vegetation than would occur along the proposed route.

1.4.7 Kern River North Bakersfield Variation

The Kern River route with the North Bakersfield Variation would involve construction of 834 miles of new pipeline. The variation was developed in an attempt to substantially reduce pipeline mileage in the San Joaquin Valley. The total variation length would be 111 miles compared with the 108 miles for the corresponding portions of the proposed route; however, substantially fewer of these miles would be in the San Joaquin Valley. The variation would depart from the proposed route at MP 722, rejoin the route at the end of the Taft Lateral (MP 47.5T) and continue along the Taft Lateral to MP 30T.

North Bakersfield Variation impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; groundwater; high significance perennial stream crossings; freshwater biology; number of California listed plant species; all wildlife habitat criteria except threatened or endangered species; socioeconomics, traffic and noise; visual resources; and system safety.

The variation would encounter at least four surface fault rupture areas, two less than would occur on the proposed route. The variation would encounter 10 miles of potential landslide areas, eight more miles than would occur on the proposed route. The variation, however, would encounter 29 miles with slope greater than 30 percent. This would be 19 more miles of potentially unstable slopes and areas with more difficult revegetation problems.

The variation would impact 242 acres of soils with poor reclamation potential, 82 more than would occur along the proposed route.

Surface water impacts would increase by ten over the proposed action. The ten additional stream crossings would be intermittent streams.

The variation would temporarily disturb 1,000 acres of native vegetation; this is 346 acres more disturbance than would occur on the proposed route. The variation would impact 210 acres of woody vegetation, 112 more than would occur on the proposed route. Impacts to riparian habitat would occur on ten acres compared to thirteen along the proposed route. The variation could impact one California state listed plant species with the potential to disturb 82 acres of habitat. This is an increase of 41 acres over the proposed route.

The variation could potentially impact 3,293 acres of habitat for federally threatened or endangered wildlife species. This is an 686-acre increase over the proposed route. These increases in potential habitat disturbed would occur to the California condor, Tehachapi slender salamander, San Joaquin kit fox, short-nosed kangaroo rat, and giant kangaroo rat. Table 1.4-1 lists the specific acreage impacts to each species of special concern.

No high sensitivity cultural resource segments would be encountered along the variation, while the portion of the route it replaces has one sensitive segment.

The variation would potentially impact 556 acres of significant paleontological formations. This would represent an increase of 511 acres over the proposed route.

1.4.8 The Kern River Proposal Best Case

In order to determine the environmentally preferred Kern River route, the variations were divided into three groups. These groups, the Utah variations, the Nevada variations and the California variations are not comparable since they do not overlap. However, within each group the variations may be compared to determine the preferable route. The Kern River Proposal Best Case will then be the sum of the preferred variations within each group. The groups are defined as follows:

Utah Variations
  Kern River Proposal MP 73-204
  Wasatch Variation

  Kern River Proposal MP 119-176
  West Strawberry Variation

  Kern River Proposal MP 180-192
  Salt Creek Canyon Variation

Nevada Variations
  Kern River Proposal MP 438-534
  North Las Vegas Variation

  Kern River Proposal MP 496-511
  Henderson Variation

California Variations
  Kern River Proposal MP 722 to end of delivery laterals
  North Bakersfield Variation

1.4.8.1 The Utah Variations

This group of variations will be compared in the following manner. The West Strawberry Variation and the Salt Creek Canyon Variation will be compared to the portions of the proposed route each would eliminate. The best combination of these route segments will be combined with the proposed route from MP 73-119, MP 176-180, and MP 192-204 for the comparison with the Wasatch Variation (see Figure 1.4-1). The winner will be the preferred route variation in Utah.

1.4.8.1.1 Kern River Proposal (MP 119-176) vs. West Strawberry Variation

As noted in Section 1.4.3 and Table 1.4-1, the significant advantages of this variation include fewer miles of landslide potential and steep slopes, and fewer acres of poor reclamation potential; fewer significant perennial stream crossings and crossings of sensitive streams; and less crucial or high priority big game habitat. The disadvantages of significance include an increase in potential impact to riparian habitat and endangered plant habitat; and increase in potential impact to big game fawning/calving areas, upland game bird habitat and raptor nests; additional potential conflicts with recreation and land use; and

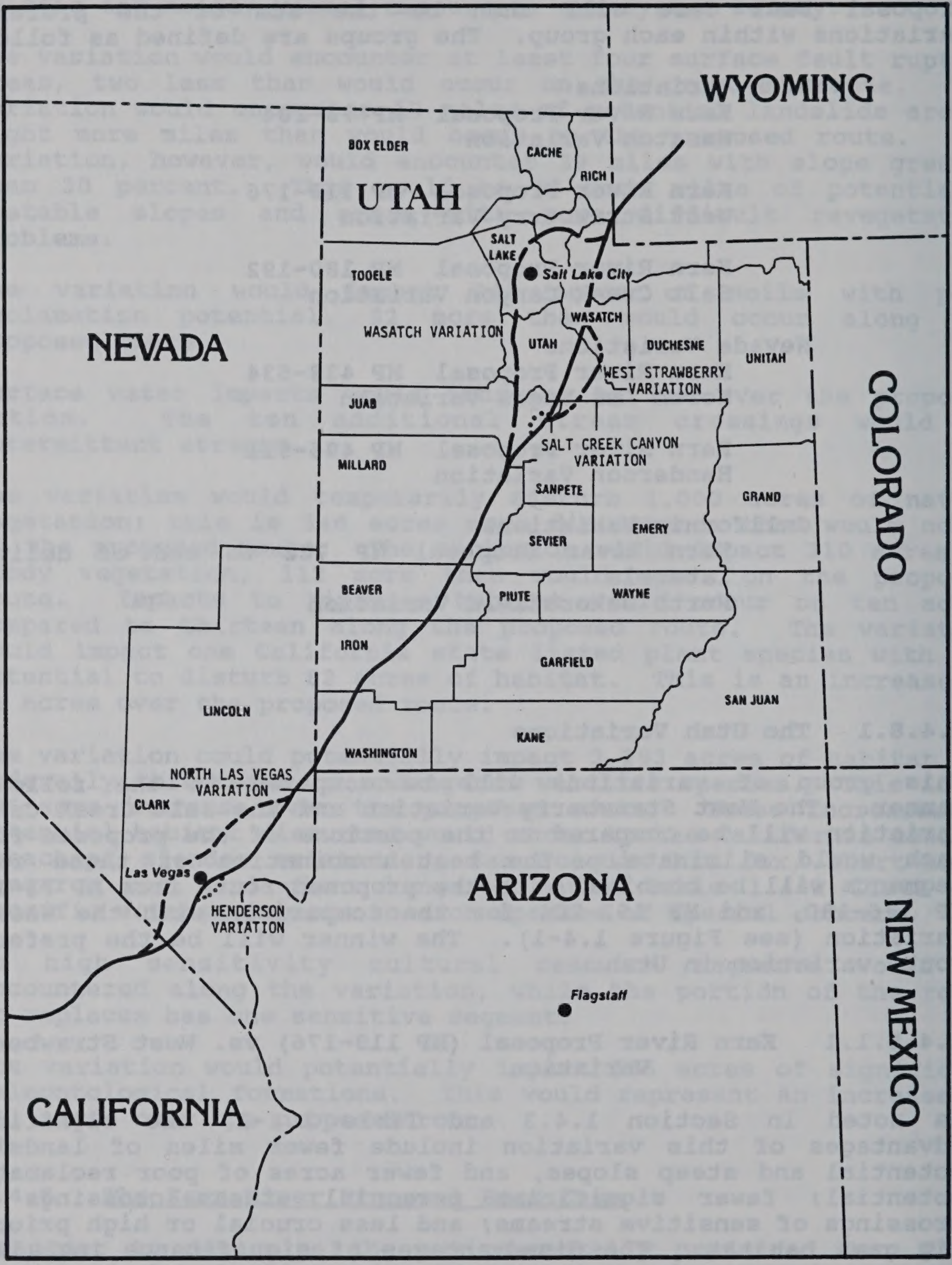
WYOMING
BOX ELDER
CACHE
RICH
UTAH
SALT LAKE
TOOELE
Salt Lake City
NEVADA
WASATCH
WASATCH VARIATION
UTAH
DUCHESNE
UNITAH
WEST STRAWBERRY VARIATION
JUAB
COLORADO
SALT CREEK CANYON VARIATION
MILLARD
SANPETE
GRAND
EMERY
SEVIER
BEAVER
PIUTE
WAYNE
IRON
GARFIELD
SAN JUAN
LINCOLN
KANE
WASHINGTON
NORTH LAS VEGAS VARIATION
CLARK
Las Vegas
ARIZONA
HENDERSON VARIATION
NEW MEXICO
Flagstaff
CALIFORNIA

Figure 1.4-1

THE KERN RIVER PROPOSED ROUTE
WITH THE UTAH AND NEVADA VARIATIONS

an increase in potential impacts to paleontologic and visual resources.

The variation would be significantly easier to construct and maintain than the proposed route since the terrain and access would be easier. These factors would also make it easier to mitigate any adverse effects to the resources which have a higher incidence of potential impact from the variation than from the proposed route. Therefore, the West Strawberry Variation would be preferable to the proposed route.

1.4.8.1.2 Kern River Proposal (MP 180-192) vs. Salt Creek Canyon Variation

As described in Section 1.4.4 and Table 1.4-1, the significant advantages of this variation include fewer miles of landslide potential and steep slopes; fewer significant perennial stream crossings and crossings of sensitive streams; fewer acres of vegetation temporarily or permanently disturbed; less crucial or high priority big game habitat and fewer waterfowl critical nesting areas. The disadvantages of significance include an increase in the potential to impact more agricultural land, an increase in the potential to encounter cultural resource sites, and more raptor nests (bald eagle habitat). Also, the Wasatch Fault crossing would lie in a more highly developed area than the proposed route.

The Salt Creek Canyon Variation would be preferable to the proposed route because it avoids several significant concerns on the proposed route. The impact to agricultural lands would be temporary and easily mitigated and the conflict with nesting areas is also easily avoided.

1.4.8.1.3 Kern River Proposal (MP 73-204) Including West Strawberry and Salt Creek Canyon Variations vs. the Wasatch Variation

Table 1.4-2 shows the comparison between the Wasatch Variation and the proposal when modified by the addition of the West Strawberry and Salt Creek Canyon Variations. The significant advantages of the Wasatch Variation include fewer miles of landslide potential and fewer acres of poor reclamation potential; fewer significant perennial stream crossings and crossings of sensitive streams; fewer acres of vegetation temporarily disturbed; fewer acres of riparian habitat and no endangered plant species; no big game migration corridors or upland game bird sensitive habitat; no land use conflict with the Uinta National Forest; and fewer acres of high visual impact. The disadvantages of significance include the crossing of an additional geologic fault and increased mileage in steep slopes; an increase in the potential to impact more agricultural lands; increases in the amount of waterfowl critical nesting areas, and

Table 1.4-2
KERN RIVER BEST CASE [1]

	Kern River Proposed	Wasatch Variation vs. Proposal with West Strawberry and Salt Creek Canyon Variations	North Las Vegas Var. vs. Proposal with Henderson Variation	Kern River with Wasatch and North Las Vegas Variations Best Case
AIR QUALITY	NSI[2]	NSI	NSI	NSI
GEOLOGY				
Surface fault rupture	23	2 (1)	1 (1)	23
Miles of landslide potential	163	42 (42)	0 (0)	136
Miles of slope greater than 30 %	229	44 (36)	8 (5)	215
SOIL				
Acres of poor reclamation potential	4882	703 (976)	1236 (976)	4324
SURFACE WATER				
Number of stream crossings	135	46 (33)	9 (24)	138
Intermittent stream crossings	83	30 (7)	7 (22)	102
Perennial stream crossings	52	16 (26)	2 (2)	36
Moderate/high significance perennial stream crossings	39	12 (17)	0 (0)	27
GROUNDWATER				
Miles of potential impact	10	4 (11)	0 (1)	11
FRESHWATER BIOLOGY				
Number of sensitive stream crossings with fish present	13	6 (7)	0 (0)	7
TERRRESTRIAL BIOLOGY				
Vegetation				
Total acres of native vegetation temporarily disturbed	8646	1370 (1412)	1320 (1211)	8736
Acres of woody vegetation kept cleared for the life of the project	2920	599 (569)	665 (615)	3028
Acres of riparian habitat crossed	98	125 (141)	10 (24)	148

Table 1.4-2 (continued)
KERN RIVER BEST CASE

	Kern River Proposed	Wasatch Variation vs. Proposal with West Strawberry and Salt Creek Canyon Variations	North Las Vegas Var. vs. Proposal with Henderson Variation	Kern River with Wasatch and North Las Vegas Variations Best Case
Vegetation (continued)				
Acres of federally threatened or endangered plant species habitat affected	0	0 (1)	0 (0)	0
Number of species	0	0 (1)	0 (0)	0
Acres of California classified plant species affected Number of species	536	0 (0)	0 (0)	536
Number of species	4	0 (0)	0 (0)	4
Acres of cropland temporarily disturbed	1561	425 (205)	0 (2)	1846
Wildlife				
Big game crucial or high priority habitat (acres)	1350	493 (624)	0 (0)	1155
Big game mitigation corridors (acres)	162	0 (77)	0 (37)	48
Big game fawning/ calving areas (acres)	0	0 (50)	0 (0)	0
Upland game bird sensitive habitat (acres)	404	24 (124)	0 (0)	428
Waterfowl critical nesting areas (acres)	60	22 (0)	0 (0)	46
Raptor nesting areas (nests) affected	12	7 (18)	0 (0)	15
Acres of potential threatened or endangered animal habitat	8404	185 (30)	424 (454)	8341
Yuma clapper rail	0	0 (0)	0 (0)	0
Bald eagle	121	65 (30)	0 (0)	168
Peregrine falcon	0	120 (0)	0 (0)	120
Whooping crane	0	0 (0)	0 (0)	0

Table 1.4-2 (continued)
KERN RIVER BEST CASE

	Kern River Proposed	Wasatch Variation vs. Proposal with West Strawberry and Salt Creek Canyon Variations	North Las Vegas Var. vs. Proposal with Henderson Variation	Kern River with Wasatch and North Las Vegas Variations Best Case
Wildlife (continued)				
California condor	1560	0 (0)	0 (0)	1560
Blunt-nosed leopard lizard	339	0 (0)	0 (0)	339
Tehachapi slender salamander	3	0 (0)	0 (0)	3
Desert tortoise	3716	0 (0)	424 (303)	3837
San Joaquin kit fox	333	0 (0)	0 (0)	333
Black-footed ferret	600	0 (0)	0 (0)	600
Utah prarie dog	0	0 (0)	0 (0)	0
Mohave ground squirrel	751	0 (0)	0 (0)	751
Nelson's antelope squirrel	290	0 (0)	0 (0)	290
Tipton kangaroo rat	24	0 (0)	0 (0)	24
Short-nosed kangaroo rat	290	0 (0)	0 (0)	290
Giant kangaroo rat	177	0 (0)	0 (0)	177
SOCIOECONOMICS				
Population change >10%	NO	NO	NO	NO
Total employment change >10%	NO	NO	NO	NO
Income change >10%	NO	NO	NO	NO
Vacancy rates of temporary housing <5%	YES	YES	YES	YES
Local tax base change >10%	YES	YES	YES	YES
Traffic	NSI	NSI	NSI	NSI

Table 1.4-2 (continued)
KERN RIVER BEST CASE

	Kern River Proposed	Wasatch Variation vs. Proposal with West Strawberry and Salt Creek Canyon Variations	North Las Vegas Var. vs. Proposal with Henderson Variation	Kern River with Wasatch and North Las Vegas Variations Best Case
SOCIOECONOMICS (continued)				
Operational noise	NSI	NSI	NSI	NSI
Recreation (conflicts)	6	2 (1)	1 (3)	4
LAND USE/OWNERSHIP				
Conflicts	5	2 (2)	0 (3)	2
CULTURAL RESOURCES				
Number of sites in the direct impact zone	77	5 (1)	6 (5)	81
NRHP listed or eligible sites	4	0 (0)	0 (0)	4
Percentage of line actually surveyed	5	1 (1)	17 (10)	6
High sensitivity segments	9	0 (1)	1 (1)	9
PALEONTOLOGY				
Acres of impact to significant formations	6119	1716 (931)	1305 (1115)	7240
VISUAL RESOURCES				
Acres of high visual impact	470	28 (329)	0 (76)	236

1/ The first entry for each resource under route variations represents the value for the variation segment only; the value in parenthesis represents the comparable quantity for the portion of the proposed route which would be avoided by using this variation.

2/ NSI = No Significant Impact.

endangered species habitat; potential to impact paleontologic resources; and the potential to impact larger population centers if a pipeline failure were to occur.

The Wasatch Variation would be preferable to the modified proposed route since the advantages overshadow the disadvantages. The disadvantages of the variation are more easily mitigated than the disadvantages of the modified proposed route because of increased reclamation potentials and relative ease of mitigation of the wildlife impacts by scheduling changes. While land use conflicts remain, avoidance of the Uinta National Forest resolves a major conflict associated with the proposed route.

The comparison between the Wasatch Variation and the unmodified Kern River Proposal is not significantly different from that outlined in Tables 1.4-1 and 1.4-2. In all significant areas, except potentially affected riparian habitat and upland game bird sensitive habitat, the relative ranking is still in favor of the Wasatch Variation. In addition, the variation is better than the unmodified proposal in terms of amount of steep slope encountered.

1.4.8.2 The Nevada Variations

This group of variations will be compared in the following manner. The Henderson Variation will be compared to the portion of the proposed route it would eliminate. The better of the two route segments will then be combined with the proposed route between MP 438-496 and 511-534 for the comparison with the North Las Vegas Variation (see Figure 1.4-1). The winner will be the preferred route in Nevada.

1.4.8.2.1 Kern River Proposal (MP 496-511) vs. Henderson Variation

The only significant advantage of the Henderson Variation is its conformance with planned development and zoning in the town of Henderson. The disadvantages are an increase in acres of poor soil reclamation potential, and more vegetation temporarily and permanently disturbed.

The variation would be preferable to the proposed route. It would be adjacent to existing roads and section lines for virtually its entire length whereas the proposal cuts across the landscape in most instances and would seldom be adjacent to any section lines or roads. For local planning purposes the variation would be preferable as it would conform to the local land use plan. In addition, the presence of road rights-of-way has already initiated the impact to vegetation which would result from the variation therefore the incremental effect is unlikely to be as great per unit of right-of-way along the variation as along the proposal route. This is a common advantage to the use of existing corridors.

1.4.8.2.2 Kern River Proposal (MP 438-534) Including the Henderson Variation vs. the North Las Vegas Variation

Table 1.4-2 shows the comparison between the North Las Vegas Variation and the proposed route when modified by the addition of the Henderson Variation. The significant advantages of the North Las Vegas Variation include a decrease in perennial stream crossings and the potential to impact riparian habitat; a decrease in potential impact to big game migration corridors; a decrease in recreation and land use conflicts; and a reduction of high visual impact.

The significant disadvantages of the variation include an increase in the area of poor soil reclamation potential; an increase in temporary and permanent impact to vegetation; an increase in the potential to encounter cultural resources sites; an increased potential to affect paleontologic resources; and an increase in the potential impact to the desert tortoise.

Comparison of the two routes favors the North Las Vegas Variation. The increase in vegetation impacts and reclamation problems on the variation is offset by the decrease in riparian impact - a more significant concern in desert environments than other natural vegetation. In this particular instance, the riparian habitat avoided would include a wetland area associated with the Las Vegas Wash. Avoidance of this wetland favors the variation. While cultural and paleontologic resources may be more abundant on the variation (it is not certain that they are), mitigation for these resources is usually highly successful. Finally, the variation has substantial advantages in terms of decreased impact to recreation, land use, and visual resources.

Thirty-five miles (424 acres) of desert tortoise crucial habitat would be crossed by the variation as opposed to 25 miles (303 acres) for the proposed route. The staff estimates the variation has the potential to impact 54 tortoises compared to 39 on the proposed route. However, implementation of the mitigation measures outlined by Reyes French [1985] would minimize impact on this species.

Comparison of the two routes is made moot, however, by the present status of the Sunrise Mountain Natural Area. Until Congress acts to remove the area from consideration as wilderness, the project would not be allowed to pass through it. However, from the previous discussion the staff believes the North Las Vegas Variation would still be the preferable Nevada variation.

1.4.8.3 The California Variations

Table 1.4-1 shows the comparison between the North Bakersfield Variation and the proposed route from MP 722 to the end of the delivery laterals. The significant advantages of the variation include a reduction in geologic fault crossings; a decrease in riparian habitat crossed; and a decrease in the potential to affect cultural resources. The significant disadvantages of the variation include increased mileage of landslide potential, high slopes, and poor soil reclamation; increased temporary and permanent impact to vegetation; increased potential to affect California classified plant species; increased potential to impact threatened or endangered species habitat (five species worse, two slightly better); and increased potential to affect paleontologic resources.

The preferred California Variation is the proposed route.

1.5 WYCAL PROPOSED ACTION

Wyoming-California Pipeline Company (WyCal) proposes to construct, own, and operate an interstate natural gas transmission pipeline from the vicinity of Opal, Wyoming, to Kern County, California. The proposed WyCal system would be approximately 1,006 miles long. Two major components make up the WyCal system, the 567-mile long northern leg which is composed of essentially the same ROW as was analyzed for the Kern River Mainline and the East Las Vegas Alternative (FEIR/S, II/3.1, 3.4, 4.2, 4.5); the 231-mile long western leg which is the Mojave Mainline as analyzed in Volume I of the FEIR/S; and four laterals including the Hams Fork Supply Lateral in Wyoming (40 miles), the Transwestern Supply Lateral in Arizona (17 miles), the Topock Supply Lateral in Arizona and eastern California (32 miles), and the Kern (44 miles) and Taft (63 miles) Laterals in the southern San Joaquin Valley of Kern County, California.

WyCal proposes to transport up to 650 MMcfd of natural gas from two major existing sources, the Overthrust Belt gas fields in southwest Wyoming and northeast Utah and the western Texas gas fields. West Texas gas would be transported through the existing El Paso and Transwestern systems identified in the FEIR/S, I across Texas, New Mexico and Arizona. These systems would join with the western leg of the WyCal route near Topock, Arizona. This would entail construction of the El Paso Base Case as it was discussed in the FEIR/S, I/3.6.1 and 4.7.1. No new facilities would be required along the Transwestern System. Overthrust gas would be collected from fields adjacent to WyCal's proposed mainline.

In addition to WyCal's proposed route, the Nevada, California, and Wasatch Variations, and three alternatives to the Wasatch Variation are examined in this document. The WyCal Proposal and the variations are outlined below with the major impacts discussed. Table 1.5-1 compares impacts associated with the WyCal proposal and its alternatives. This discussion includes the impacts associated with the construction necessary for the El Paso Base Case.

1.5.1 WyCal Proposal

The WyCal system would begin near Hams Fork, Wyoming, traverse 16 counties in five states, and terminate in the Bakersfield, California, area. Four compressor stations providing a total of 53,000 hp would be constructed as part of the project. The route would follow existing utility and transportation corridors for approximately 61 percent of its length.

The proposed action would not significantly affect air quality along the route during either construction or operation. Construction impacts to air quality would represent a temporary source of both dust and engine emissions. Operation of the four new compressor stations located in Wyoming, Utah, Nevada, and Arizona, would meet all applicable state and federal regulations. Air quality changes in Kern County resulting from project implementation would be positive.

The proposed route would encounter at least 35 Quaternary surface faults. The greatest potential for surface fault ruptures would be in the western portions of the route in California and in the central Utah portion of the route. Pipeline design criteria would adequately mitigate potential hazards due to surface fault ruptures.

Approximately 149 miles of potential landslide areas would be crossed by the proposed route. The majority of the potential landslide areas would occur between NL 69 and 196. In addition to the miles of landslide potential, 214 miles of the route would be constructed in areas with a slope greater than 30 percent. These areas are again concentrated along the mountainous portions of the route in north-central Utah and the Tehachapi Mountains portion of the route in southern California.

The proposed route would cross approximately 6,176 acres of land in areas with soils having poor reclamation potential. These areas are located primarily in the Mojave Desert geographic region in California (NL 400 to 605 and WL 0 to 228), although impacts in the Middle Rocky Mountains (NL 38 to 195) and Basin and Range (NL 195 to 400) areas of Utah and Nevada would also be significant. Implementation of erosion control, restoration, and revegetation guidelines would help to stabilize many of the areas. The Mojave Desert region, due to low rainfall, may take many years before vegetation would adequately recover. Similar problems with revegetation may occur in the Middle Rocky Mountains region primarily due to steep slopes, although well-designed erosion control plans should alleviate most of the problems.

Table 1.5-1

WYCAL SUMMARY OF IMPACTS [1/]

		Wasatch Variations [4/]				
	Wycal [2/] Proposed	Wasatch Variation	Bountiful Boulevard Alternative	Pages Lane Alternative	Bountiful Peak Alternative	North Las Vegas Variation
AIR QUALITY	NSI [3/]	NSI	NSI	NSI	NSI	NSI
GEOLOGY						
Surface fault rupture	35	2 (1)	2 (1)	2 (1)	2 (1)	2 (2)
Miles of landslide potential	149	42 (69)	42 (69)	37 (69)	45 (69)	0 (0)
Miles of slope greater than 30%	214	44 (61)	40 (61)	40 (61)	43 (61)	11 (5)
SOIL						
Acres of poor reclamation potential	6176	703 (1570)	685 (1570)	681 (1570)	728 (1570)	1388 (728)
SURFACE WATER						
Number of stream crossings	161	46 (40)	47 (40)	48 (40)	54 (40)	10 (6)
Intermittent stream crossings	96	30 (10)	31 (10)	28 (10)	28 (10)	8 (2)
Perennial stream crossings	54	16 (30)	16 (30)	15 (30)	14 (30)	2 (4)
Moderate/high significance perennial stream crossings	45	12 (24)	12 (24)	12 (24)	13 (24)	0 (0)
GROUNDWATER						
Miles of potential impact	30	4 (2)	4 (2)	4 (2)	4 (2)	0 (1)
FRESHWATER BIOLOGY						
Number of sensitive stream crossings with fish present	17	6 (14)	6 (14)	6 (14)	6 (14)	0 (0)
TERRESTRIAL BIOLOGY						
Vegetation						
Total acres of native vegetation temporarily disturbed	10917	1370 (1438)	1369 (1438)	1296 (1438)	1342 (1438)	1831 (1408)
Acres of woody vegetation kept cleared for the life of the project	3858	599 (612)	599 (612)	567 (612)	590 (612)	903 (695)
Acres of riparian habitat crossed	183	125 (61)	124 (61)	116 (61)	116 (61)	27 (19)

Table 1.5-1 (continued)

WYCAL SUMMARY OF IMPACTS 1/

	Wycal 2/ Proposed	Wasatch Variations 4/				North Las Vegas Variation
		Wasatch Variation	Bountiful Boulevard Alternative	Pages Lane Alternative	Bountiful Peak Alternative	
Vegetation (continued)						
Acres of federally threatened or endangered plant habitat affected	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Number of species	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Acres of California classified plant species affected	947	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Number of species	3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Acres of agricultural land temporarily disturbed	1288	425 (138)	426 (138)	484 (138)	520 (138)	0 (25)
Wildlife						
Big game crucial or high priority habitat (acres)	1423	493 (688)	503 (688)	499 (688)	499 (688)	55 (0)
Big game migration corridor (acres)	211	0 (77)	0 (77)	0 (77)	0 (77)	0 (0)
Big game fawning/calving area (acres)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Upland game bird sensitive habitat (acres)	335	24 (0)	24 (0)	24 (0)	24 (0)	0 (0)
Waterfowl critical nesting areas (acres)	60	22 (36)	22 (36)	22 (36)	22 (36)	0 (0)
Raptor nesting areas (nests)	18	7 (4)	7 (4)	7 (4)	7 (4)	0 (0)
Acres of potential threatened or endangered animal habitat	9283	185 (18)	185 (18)	293 (18)	393 (18)	908 (484)
Yuma clapper rail	127	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bald eagle	284	65 (18)	65 (18)	65 (18)	165 (18)	0 (0)
Peregrine falcon	163	120 (0)	120 (0)	225 (0)	225 (0)	0 (0)
Whooping crane	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 1.5-1 (continued)

WYCAL SUMMARY OF IMPACTS 1/

	Wycal 2/ Proposed	Wasatch Variations 4/				North Las Vegas Variation
		Wasatch Variation	Bountiful Boulevard Alternative	Pages Lane Alternative	Bountiful Peak Alternative	
Wildlife (continued)						
California condor	1355	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Blunt-nosed leopard lizard	517	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tehachapi slender salamander	18	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Desert tortoise	3659	0 (0)	0 (0)	0 (0)	0 (0)	908 (484)
San Joaquin kit fox	647	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Black-footed ferret	640	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Utah prairie dog	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mohave ground squirrel	727	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nelson's antelope squirrel	412	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tipton kangaroo rat	24	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Short-nosed kangaroo rat	410	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Giant kangaroo rat	300	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
SOCIOECONOMICS						
Population change >10%	no	no	no	no	no	no
Total employment change >10%	no	no	no	no	no	no
Income change >10%	no	no	no	no	no	no
Vacancy rates of temporary housing <5%	yes	yes	yes	yes	yes	yes
Local tax base change >10%	7 counties	1 county	1 county	1 county	1 county	0 county
Traffic	NSI	NSI	yes	yes	NSI	NSI

Table 1.5-1 (continued)

WYCAL SUMMARY OF IMPACTS 1/

		Wasatch Variations 4/				
	Wycal 2/ Proposed	Wasatch Variation	Bountiful Boulevard Alternative	Pages Lane Alternative	Bountiful Peak Alternative	North Las Vegas Variation
SOCIOECONOMICS (continued)						
Operational noise	NSI	NSI	NSI	NSI	NSI	NSI
Recreation (conflicts)	10	2 (1)	1 (1)	1 (1)	3 (1)	2 (3)
LAND USE/OWNERSHIP						
Number of conflicts	13	2 (1)	1 (1)	1 (1)	2 (1)	0 (4)
CULTURAL RESOURCES						
Number of sites in the direct impact zone	109	5 (2)	5 (2)	5 (2)	5 (2)	7 (10)
NRHP listed or eligible sites in the direct impact zone	6	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Percentage of line actually surveyed	6	1 (1)	1 (1)	1 (1)	1 (1)	12 (11)
High sensitivity segments	8	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
PALEONTOLOGIC RESOURCES						
Acres of impact to significant formations	6458	1716 (776)	1806 (776)	1731 (776)	1768 (776)	1692 (1267)
VISUAL RESOURCES						
Acres of high visual impact	263	28 (186)	0 (186)	0 (186)	12 (186)	0 (76)

1/ The first entry for each resource under route variations represents the value for the variation segment only; the value in parenthesis represents the comparable quanity for the portion of the proposed route which would be avoided by using this variation.

2/ Includes impacts associated with the El Paso Base Case.

3/ NSI = No Significant Impact

4/ These columns present impacts associated with the original Wasatch Variation route which was covered in the FEIR/S, and with routes which incorporate the identified alternative into the Wasatch Variation. The first entry for each resource under each alternative to the Wasatch Variation represents the value for the entire alternative route; the value in parenthesis represents the comparable quantity for the portion of the proposed route which would be avoided by using this alternative of the Wasatch Variation.

The proposed route would cross 161 intermittent and perennial streams. Fifty-four perennial stream crossings would be necessary with forty-five of these stream crossings having moderate to high significance due to channel gradient, stream bed characteristics, and sideslope. Even if mitigation measures were applied, it is likely that some level of increased sediment loading would continue for a period after construction was completed. The largest number of these sensitive stream crossings would occur in the Middle Rocky Mountains region.

There would be approximately 30 miles of medium and high potential impacts to groundwater resources along the proposed route. These impacts would be distributed within the Wasatch and Tehachapi Mountains, Mojave River Valley, and Las Vegas Valley. It is unlikely that impacts to groundwater would be significant if the mitigation measures outlined are adhered to.

The WyCal proposed route would have significant impacts to freshwater biology at 17 stream crossings. Principal impacts on aquatic environments would result from construction and include increased sedimentation, substrate removal, and habitat alteration. All of the sensitive stream crossings would occur in the Middle Rocky Mountains region between MP 38-195. Mitigation measures which reduce the amount of sediments introduced to the streams and avoid critical fish spawning times could greatly reduce the amount of overall impact.

The proposed route would temporarily disturb 10,917 acres of native vegetation and may impact the blackbrush scrub and the lowland saltbush scrub communities. The blackbrush scrub vegetation type represents a select community which may be impossible to revegetate to pre-construction conditions. In addition to these communities, Joshua trees and cactus which are scattered in the creosote and saltbush vegetation types may also be adversely affected. The proposed route would keep 3,858 acres of woody vegetation cleared from the operational ROW for the life of the project. Due to the low revegetative potential along many portions of the proposed route, woody plant species may not reoccur for well over 50 years. Construction of the pipeline would also impact approximately 183 acres of riparian habitat.

No federally threatened or endangered plant species would be impacted; however, three California state listed plant species could be impacted. This plant habitat occurs along 947 acres of the route.

In addition to the impacts to native vegetation, the proposed route would temporarily disturb 1,288 acres of agricultural land, primarily in the Basin and Range region and the San Joaquin Valley. These impacts would not last beyond one agricultural season. The route would also remove 158 acres of orchards and vineyards from production in the San Joaquin Valley for the life of the project.

The proposed route would significantly impact 1,423 acres of big game crucial or high priority habitat primarily between NL 0 and 400 and would also affect 211 acres of big game migration corridors primarily in the Middle Rocky Mountains region. Approximately 335 acres of sensitive upland game bird habitat would be impacted by the proposed action particularly in the Basin and Range and Mojave Desert areas.

Sixty acres of crucial waterfowl nesting areas would be impacted in the Basin and Range area. Eighteen known raptor nests along the route could be significantly affected.

In addition to impacts to wildlife, 9,283 acres of potential habitat of threatened or endangered wildlife species would be adversely affected by the proposed action. Major impacts would occur to habitat of the California condor (1,355 acres), black-footed ferret (640 acres), Mohave ground squirrel (727 acres), and desert tortoise (3,659 acres). Acreages of habitat suitable for other species of special concern which would be impacted are listed in Table 1.5-1.

The WyCal construction workforce would place a significant but temporary demand on housing and campgrounds in areas of central and southern Utah, southern Nevada, and San Bernardino County in California. This would inconvenience travelers and campers seeking accommodations if the construction period occurred during the tourist season. Property tax revenues would increase more than 10 percent in seven counties crossed by the pipeline. Positive although not significant changes in total employment and overall income would also occur as a result of construction.

The proposed route would have no significant impacts to traffic since major roads along the route would be crossed by boring beneath paved roads. Noise impacts caused by construction would be temporary in nature and would only occur during working hours. Since the majority of the proposed route would be constructed in relatively uninhabited areas, noise resulting from construction would not present a significant problem. Noise resulting from compressor station operation is expected to be below an Ldn of 55 dBA at nearby noise sensitive areas.

There is no vehicle access into most of the mainline route from NL 120 to 152. New roads would have to be approved by the Forest Service prior to construction. In several areas, new roads would cause unavoidable adverse impacts to soils, land stability, and other watershed values. The Forest Service may deny approval of new roads in these areas and specify helicopter supported construction.

The proposed route would conflict with the operation of ten recreation areas with most of the impacts temporary in nature. Construction activities could adversely affect competition for camping space in developed campgrounds in the Wasatch-Cache and Uinta National Forests, particularly if construction takes place between May and October. There would also be impacts to the Sunrise Mountain Natural Area, Rainbow Gardens, and the proposed Clark County Wetlands Park on the Las Vegas Wash during the construction period in the form of increased traffic, vegetation disturbance, water quality degradation, and disruption of the natural visual quality. While most of these impacts are expected to be short-term, and in the instance of the Wetlands Park may occur prior to park development, visual disruption and the loss of any unique geologic/topographic feature within the ROW in the Rainbow Gardens area would be permanent. Other significant impacts would occur to the Parker 400 ORV race route, Havasu National Wildlife Refuge, Pacific Crest National Scenic Trail, Tehachapi Mountain Park and Kern River State Park on the western leg of the route with temporary disturbance during construction in the form of interruption or delay of traffic, disturbance of vegetation and soils, and disruption of the natural visual quality.

The northern leg of the proposed action would conflict with the Utility Corridor Rule as presented in the Forest Land and Resource Management Plan for the Uinta National Forest. Construction along the proposed route would violate the intent of the plan in designating lands suitable for utility corridors. Another significant conflict would occur with the Sunrise Mountain Natural Area because BLM cannot issue a ROW grant for an activity which would permanently alter this area. Until this area (which is not recommended for Wilderness status) has been formally removed from the list, an unavoidable land use conflict would occur.

While direct construction impacts to the Rainbow Gardens area would be both short and potentially long-term, the longer term implications of facilitating access to the area are of substantial concern. Given the potential to accelerate degradation of the area, this impact is considered significant.

The proposed action is not in compliance with the Master Plan for the proposed Clark County Wetlands Park. The route would also conflict with land use plans for the city of Henderson, Nevada.

The western leg of the proposed action would conflict with zoning regulations around the Golden Shores Subdivision along the Transwestern Supply Lateral. The supply lateral would also conflict with the land use of the Havasu NWR and lies outside of the utility corridors in the Yuma BLM District. The western leg would also be outside of the BLM California Desert District Conservation Area utility corridor between Pisgah and Boron in San Bernardino County. The BLM policy is to follow the corridor whenever possible. The route also has the potential to conflict with the land use plans of Edwards Air Force Base in Kern County, as well as at the Stallion Springs community, Tehachapi Mountain Park, and Kern River State Park.

The WyCal route would encounter two 25-mile long segments with a very high cultural resources sensitivity rating and six segments with a high sensitivity rating. Compliance procedures, however, should provide adequate mitigation to potential impacts.

Approximately 6,458 acres of significant paleontological formations would be crossed by the proposed route. Implementation of the mitigation measures in this document would reduce the potential impacts to paleontological resources to insignificance.

Approximately 263 acres of the route would have highly significant impacts to visual quality. The majority of these impacts would occur in the Uinta National Forest (187 acres); the remainder are dispersed along the route.

Safety concerns along the northern leg of the route would be confined to some residential areas of Henderson and near East Las Vegas, Nevada. The primary areas of concern along the western leg include housing near Indian John Spring, the Stallion Springs residential community, and the residential areas of Bakersfield. These safety issues concern areas near fault crossings and the associated concerns with pipeline ruptures. With proper mitigation, these safety concerns should not be significant.

1.5.2 WyCal Wasatch Variation

The WyCal route with the Wasatch Variation would entail construction of 1,016 miles of pipeline. The Wasatch Variation would avoid crossing approximately 100 miles of rugged, mountainous terrain which would be traversed by the proposed route. It also avoids crossing the Uinta National Forest. The variation is approximately 154 miles in length versus 131 miles along the portion of the proposed route it would replace. The variation diverges from the proposed route at approximately NL 83 and would rejoin at NL 214.

Wasatch Variation impacts would be identical to those identified for the Kern River Wasatch Variation discussed in Section 1.4.2.

1.5.2.1 The Wasatch Variation with the Bountiful Boulevard Alternative

The WyCal route with the Bountiful Boulevard Alternative of the Wasatch Variation would also entail construction of 1,016 miles of pipeline. The Bountiful Boulevard Alternative would avoid some of the slope instability, revegetation, ORV use, watershed, and visual concerns associated with a small segment of the Wasatch Variation. This alternative to the Wasatch Variation begins at MP 39.6 of the Wasatch Variation and rejoins the variation at MP 46.4 south of Hooper Canyon.

The Bountiful Boulevard Alternative impacts would be identical to those identified for the WyCal Mainline route and the Wasatch Variation or would differ insignificantly for the following resource areas: air quality; orchards and vineyards permanently removed; noise; number of high cultural resource sensitivity segments; federally threatened or endangered plant species; and California state listed plant species.

This alternative would still encounter the Wasatch Fault in a potentially more hazardous location than the proposed route. Also, an additional area of faulting (the West Valley Fault Zone) would be crossed by the alternative. The alternative would cross 42 miles of areas with potential landslide activity, as opposed to 69 miles for the portion of the route it would replace. The alternative would also impact 40 miles of land containing slopes greater than 30 percent, compared to 61 miles along the portion of the route it replaces.

The Wasatch Variation with the Bountiful Boulevard Alternative would cross 685 acres of soils having poor reclamation potential, 885 fewer than the proposed portion of the route.

It would cross 47 streams, an increase of seven over the portion of the mainline it would replace. This increase primarily occurs to intermittent stream crossings; 21 additional crossings were encountered. Impacts to perennial streams would decrease to 16 from the 30 identified along the proposed route. Impacts to perennial streams with moderate to high significance also decreased to 12, 12 fewer than the proposed route portion.

Groundwater impacts along this alternative would occur along four miles in the Wasatch Mountains, about two miles more than the portion of the proposed route it would replace. This difference is not considered significant.

Impacts to freshwater biology with regard to the number of sensitive stream crossings containing fish would decrease by eight to a total of six significant stream crossings if this alternative were adopted.

Approximately 1369 acres of native vegetation would be temporarily disturbed on the alternative, 69 fewer than would be impacted by the proposed action. Further, the alternative would permanently remove 599 acres of woody vegetation. This is 13 fewer than the proposed action.

It would potentially impact 124 acres of riparian habitat compared to 61 acres on the portion of the proposed route it would replace. This is a significant disadvantage. The alternative would also temporarily disturb 426 acres of agricultural land, 288 more than the proposed route segment.

Impacts to 503 acres of big game critical or high priority habitat versus 688 along the proposed route would occur. The alternative would affect no big game migration corridors, as opposed to the 77 acres which would be impacted by the proposed route. Approximately 24 acres of upland game bird sensitive habitat would be affected. This is 24 more acres than the proposed action. Twenty-two acres of critical waterfowl nesting areas would be affected by the alternative, 14 fewer than the proposed route. A total of seven known raptor nests would be impacted, three more than the proposed route.

Approximately 185 acres of potential habitat of federal threatened or endangered wildlife species would be affected by the alternative. This is 167 more than the proposed route. These 185 acres would affect bald eagle winter concentration areas and peregrine falcon hunting territory.

Socioeconomic impacts would be similar to those discussed for the proposed action, although different counties in Utah would be involved. The Bountiful Boulevard Alternative would remain within the Ward Canyon Utility Corridor within the Wasatch-Cache National Forest. This accessibility is particularly advantageous when compared to the portion of the route in the Uinta National Forest which it would replace. Utilization of the Bountiful Boulevard Alternative would cause a significant impact to traffic since the road itself would be utilized as the ROW. This impact would occur during the construction phase and possibly during maintenance activities.

Impacts to recreation facilities would be similar to the proposed action although impacts to campgrounds in the Uinta National Forest would not occur. The Bountiful Boulevard Alternative would also be adjacent to a golf course and temporary impacts may occur during construction.

Use of the Bountiful Boulevard Alternative with the Wasatch Variation would resolve the major institutional problem which faced the WyCal proposal, i.e., routing in a north-south direction across the Uinta National Forest. This problem is manifested in the Uinta's Standards and Guidelines for Utility Corridors (Standards and Guidelines). Use of the alternative would also resolve the problems associated with utilization of the Wasatch Variation concerning conflicts with the Standards and Guidelines for the Wasatch-Cache National Forest.

This alternative is essentially unroaded for about 33 miles between the crossing of I-80 and its descent into the Salt Lake Valley. It would however lie largely within the Ward Canyon Utility Corridor and utilization of the corridor would preclude building of new roads, thus avoiding additional adverse impacts to soils, land stability, and other watershed values associated with the Wasatch Variation.

Disadvantages associated with the adoption of the alternative include utilization of an existing street with a number of underground utility lines in Bountiful City. This may cause severe disruption to, or require relocation of, city services such as water, sewer, telephone, and electricity during construction and/or maintenance activities. Residents may experience service curtailments during pipeline construction and subsequent service disruptions whenever utility line or gas pipeline maintenance activities are necessary. This is felt to be a significant disadvantage.

No high sensitivity cultural resource segments are present in either the alternative or the replaced portion of the route.

The alternative has the potential to impact 1,806 acres of land containing significant paleontological formations. This is 1,030 more than the proposed route. While this is a disadvantage, it is considered minor because mitigation for this resource is typically highly successful.

The Bountiful Boulevard Alternative with the Wasatch Variation would have no high significance impacts to visual resources as opposed to the 186 acres along the proposed route it would replace. This is a significant advantage.

The Bountiful Boulevard Alternative with the Wasatch Variation would have significantly greater safety concerns due to the proximity of the large population centers associated with the greater Salt Lake region of Utah than either the mainline or the Wasatch Variation. Safety concerns include areas of Bountiful City, particularly the houses and proposed houses along Bountiful Boulevard, North Salt Lake, and West Valley City, where pipeline rupture could cause significant damage. The possibility of rupture or damage induced by construction equipment use relating to maintenance of other utilities in the roadbed would also increase. The likelihood of such an occurrence happening, however, is remote.

1.5.2.1.1 The Bountiful Boulevard Alternative (MP 39.6-46.4)

The Bountiful Boulevard Alternative is about 6.8 miles long; its adoption would decrease the length of the Wasatch Variation by about 0.1 mile. The alternative begins at MP 39.6 of the Wasatch Variation and rejoins the variation at MP 46.4 south of Hooper Canyon.

Most impacts associated with the Bountiful Boulevard Alternative would be identical (or would differ insignificantly) to those identified for the portion of the Wasatch Variation which the alternative would replace. As a result, only those resource areas where impacts were found to be different are discussed below.

Use of the Bountiful Boulevard Alternative would reduce the miles of land containing slopes greater than 30 percent by four miles.

It would also reduce the amount of land with soils having poor reclamation potential by 18 acres.

It would cross one more intermittent stream and would also lessen impact to native vegetation temporarily disturbed and riparian habitat by one acre each.

The Bountiful Boulevard Alternative would increase by one the number of acres of agricultural land temporarily disturbed, and increase by 10 the impacted acreage of big game crucial or high priority habitat.

Further, utilization of the boulevard may cause both short-term and long-term problems with existing and new city services. As was referenced in Section 1.5.2.1.1, use of the boulevard may cause both short- and long-term problems with city utility services. Traffic impacts would also be anticipated since the road itself would be used as the ROW. Both of these factors are considered to be significant disadvantages associated with this alternative.

The Bountiful Boulevard Alternative would cross the Wasatch-Cache National Forest within a designated utility corridor. This provides a number of benefits, including resolution of the conflict posed by the corresponding portion of the Wasatch Variation with the Forest's Standards and Guidelines. It would reduce recreational conflicts by completely avoiding Mueller Park, and also provide a measure of accessibility not available on the portion of the Wasatch Variation which it would replace. Use of the Ward Canyon Corridor would completely eliminate the 28 acres of high visual impact associated with the corresponding portion of the Wasatch Variation.

The Bountiful Boulevard Alternative would have significantly greater safety concerns due to the proximity of the large populations centers through which it would traverse compared to the portion of the Wasatch Variation it would replace. The Bountiful Boulevard Alternative would be placed within a major existing and/or proposed city street within Bountiful City as opposed to the more rural residential areas of the Wasatch Variation. This is felt to be a significant disadvantage.

In summary, the Bountiful Boulevard Alternative would resolve some of the problems of the Wasatch Variation, including some of the watershed, steepness of slopes, soil erosion, and visual concerns. It would, however, create additional concerns with regard to acres of agricultural land disturbed, disturbance to big game habitat and will cause significant disruption of traffic in Bountiful City on a temporary basis during construction and possibly during routine maintenance activities for the life of the project. Because of its proximity to a number of existing underground utilities, both short- and long-term impacts to utility service would be expected to result from construction of the pipeline and maintenance activities on either the pipeline or the utility lines. These concerns coupled with the increase in safety concerns associated with the pipeline being within 100 feet of over 100 houses argue against the alternative.

1.5.2.2 The Wasatch Variation with the Pages Lane Alternative

The WyCal route with the Pages Lane Alternative of the Wasatch Variation would entail construction of 1,017 miles of pipeline. The Pages Lane Alternative would also avoid some of the slope instability, revegetation, ORV use, watershed, and visual concerns associated with a segment of the Wasatch Variation. This alternative to the Wasatch Variation also begins at MP 39.6 of the Wasatch Variation and rejoins the variation at MP 52.6 near the northern end of the Salt Lake City International Airport runway.

The Pages Lane Alternative impacts would be identical to those identified for the WyCal Mainline route or insignificantly different for the following resource areas: air quality; orchards and vineyards permanently removed; noise; number of high cultural resource sensitivity segments; federally threatened or endangered plant species; and California state listed plant species.

This alternative would encounter the Wasatch Fault in a potentially more hazardous location than the proposed route. Also, an additional area of faulting (the West Valley Fault Zone) would be crossed. The alternative would cross 37 miles of areas with potential landslide activity, as opposed to 69 miles for the portion of the route it would replace. It would also impact 40 miles of land containing slopes greater than 30 percent, compared to 61 miles along the portion of the route it replaces.

The Wasatch Variation with the Pages Lane Alternative would cross 681 acres of soils having poor reclamation potential, 889 fewer than the proposed portion of the route.

The alternative would cross 48 streams, eight more than the portion of the mainline it would replace. This increase primarily occurs to intermittent stream crossings, where 18 additional crossings were encountered. Impacts to perennial streams would decrease to 15 from the 30 identified along the proposed route. Impacts to perennial streams with moderate to high significance also decreased to 12, 12 fewer than the proposed route portion.

Groundwater impacts along this alternative to the Wasatch Variation would occur along four miles in the Wasatch Mountains, about two miles more than the portion of the proposed route it would replace. This difference is not considered significant.

Impacts to freshwater biology with regard to the number of sensitive stream crossings containing fish would decrease by eight to a total of six significant stream crossings if this alternative were adopted.

Approximately 1,296 acres of native vegetation would be temporarily disturbed on the alternative, 142 fewer than would be impacted by the proposed action. Further, the variation would permanently remove 567 acres of woody vegetation. This is 45 fewer than the proposed action.

This alternative would potentially impact 116 acres of riparian habitat compared to 61 acres on the portion of the proposed route it would replace. This is a significant disadvantage. It would also temporarily disturb 484 acres of agricultural land, 356 more than the proposed route segment.

Impacts to 499 acres of big game critical or high priority habitat would occur, versus 688 along the proposed route. The alternative would affect no big game migration corridors, as opposed to the 77 acres which would be impacted by the proposed route. Approximately 24 acres of upland game bird sensitive habitat would be affected, 24 more acres than the proposed action. Twenty-two acres of critical waterfowl nesting areas would be affected by the alternative, 14 fewer than the proposed route. A total of seven known raptor nests would be impacted, three more than the proposed route.

Approximately 293 acres of potential habitat of federal threatened or endangered wildlife species would be affected by the alternative. This is 275 more than the proposed route. These 293 acres would affect bald eagle winter concentration areas and peregrine falcon hunting territory.

Impacts to socioeconomics would be similar to those discussed for the proposed action, although different counties in Utah would be involved. The alternative would remain within the Ward Canyon Utility Corridor within the Wasatch-Cache National Forest. This accessibility is particularly advantageous when compared to the portion of the route in the Uinta National Forest which it would replace. Utilization of the Pages Lane Alternative would cause a significant impact to traffic since the road itself would be utilized as the ROW. This impact would occur during the construction phase and possibly during maintenance activities.

Impacts to recreation facilities would be similar to the proposed action although impacts to campgrounds in the Uinta National Forest would not occur.

Use of the Pages Lane Alternative (as with the Bountiful Boulevard Alternative) with the Wasatch Variation would resolve the major institutional problem which faced the WyCal proposal, i.e., routing in a north-south direction across the Uinta National Forest. This problem is manifested in the Uinta's Standards and Guidelines. Use of the alternative would also resolve the problems associated with utilization of the Wasatch

Variation concerning conflicts with the Standards and Guidelines for the Wasatch-Cache National Forest.

This alternative is essentially unroaded for about 33 miles between the crossing of I-80 and its descent into the Salt Lake Valley. It would, however, lie within the Ward Canyon Utility Corridor and thus utilization of the corridor would preclude building of new roads, thus avoiding the adverse impacts to soils, land stability, and other watershed values associated with the Wasatch Variation.

Disadvantages associated with the adoption of the alternative include utilization of an existing street in Bountiful City. This may cause both short- and long-term problems with city services, as was described for the Bountiful Boulevard Alternative above. Over 125 homes exist within 100 feet of the proposed route as does an elementary school and a commercial center.

No high sensitivity cultural resource segments are present in either the alternative or the replaced portion of the route.

The alternative has the potential to impact 1,731 acres of land containing significant paleontological formations. This is 955 more than the proposed route. While this is a disadvantage, it is considered minor because mitigation for this resource is typically highly successful.

The Pages Lane Alternative to the Wasatch Variation (like the Bountiful Boulevard route) would have no high significance impacts to visual resources as opposed to the 186 acres along the proposed route it would replace.

The Wasatch Variation utilizing the Pages Lane Alternative would have significantly greater safety concerns due to the proximity of large population centers associated with the greater Salt Lake region of Utah. Safety concerns include areas of Bountiful City, Centerville, West Bountiful, and West Valley City, where pipeline rupture could cause significant damage. Again, utilization of a major city street as a pipeline ROW has significant safety drawbacks. The presence of over 120 homes, commercial property, and an elementary school within 100 feet of the centerline of the route must be considered. The likelihood of a pipeline rupture occurring, however is remote.

1.5.2.2.1 The Pages Lane Alternative (MP 39.6-53.3)

The Pages Lane Alternative is about 13.7 miles long; its adoption would increase the length of the Wasatch Variation by about 0.7 miles. The alternative begins at MP 39.6 of the Wasatch Variation and rejoins the variation at MP 52.6 near the northern end of the Salt Lake City International Airport runway.

Most impacts associated with the Pages Lane Alternative would be identical (or would differ insignificantly) to those identified for the portion of the Wasatch Variation which the alternative would replace. As a result, only those resource areas where impacts were found to be different are discussed below.

Use of the Pages Lane Alternative would reduce the miles of landslide potential by five miles and would also reduce the miles of land containing slopes greater than 30 percent by four miles. It would also reduce the amount of land with soils having poor reclamation potential by 22 acres.

It would cross one less perennial stream and two fewer intermittent streams. The alternative would also lessen impact to native vegetation temporarily disturbed by 74 acres, acres of woody vegetation disturbed for the life of the project by 32 acres, and riparian habitat by nine acres.

The Pages Lane Alternative would increase disturbance to agricultural land by 59 acres, and increase by six the impacted acreage of big game crucial or high priority habitat. It would also increase disturbance to the hunting territory of the peregrine falcon by 105 acres.

Utilization of Pages Lane may cause both short- and long-term problems with both existing and new city services as was described for the Bountiful Boulevard Alternative above. This is felt to be a significant disadvantage.

The Pages Lane Alternative would cross the Wasatch-Cache National Forest within a designated utility corridor. This provides a number of benefits, including resolution of the conflict posed by the corresponding portion of the Wasatch Variation with the Forest's Standards and Guidelines. It would reduce recreational conflicts by completely avoiding Mueller Park, and also provide a measure of accessibility not available to the portion of the Wasatch Variation which it would replace. Use of the Ward Canyon corridor would completely eliminate the 28 acres of high visual impact associated with the corresponding portion of the Wasatch Variation.

The Pages Lane Alternative would have significantly greater safety concerns due to the proximity of the large populations centers through which it would traverse compared to the portion of the Wasatch Variation it would replace. The Pages Lane Alternative would be placed within a major city street within Bountiful City, Centerville, and West Bountiful, as opposed to the more rural residential areas of the Wasatch Variation. This is felt to be a significant disadvantage.

In summary, the Pages Lane Alternative would resolve some of the problems of the Wasatch Variation, including some of the watershed, steepness of slopes and landslide potential, soil erosion, and visual concerns. It will, however, create additional concerns with regard to acres of agricultural land disturbed, disturbance to big game habitat and threatened and endangered animal species and will cause significant disruption of traffic in both Bountiful City, Centerville and West Bountiful on a temporary basis during construction and possibly during routine maintenance activities for the life of the project. Both short- and long-term disruption to city utility services may also occur. These concerns coupled with the increase in safety concerns associated with the pipeline being within 100 feet of numerous houses argue against the alternative.

1.5.2.3 The Wasatch Variation with the Bountiful Peak Alternative

The WyCal route with the Bountiful Peak Alternative with the Wasatch Variation would require construction of 1,022 miles of pipeline. The Bountiful Peak Alternative would avoid some of the revegetation, ORV use, watershed, and visual concerns associated with the Wasatch Variation in the Wasatch Front Range. This alternative to the Wasatch Variation begins at MP 38.5 of the Wasatch Variation and rejoins the variation at MP 52.6 near the northern end of the Salt Lake City International Airport runway. The Bountiful Peak Alternative completely avoids the Bountiful City and North Salt Lake areas, but instead traverses more Forest Service lands and runs along the boundary of northern Centerville/southern Farmington, Utah.

The Bountiful Peak Alternative impacts would be identical to those identified for the WyCal Mainline route or would differ insignificantly for the following resource areas: air quality; orchards and vineyards permanently removed; traffic and noise; number of high cultural resource sensitivity segments; federally threatened or endangered plant species; and California state listed plant species.

This variation would encounter the Wasatch Fault in a potentially more hazardous location than the proposed route. Also, an additional area of faulting (the West Valley Fault Zone) would be crossed. The alternative would cross 45 miles of areas with potential landslide activity, as opposed to 69 miles for the portion of the route it would replace. It would also impact 43 miles of land containing slopes greater than 30 percent, compared to 61 miles along the portion of the route it replaces.

The Wasatch Variation with the Bountiful Peak Alternative would cross 728 acres of soils having poor reclamation potential, 842 fewer than the proposed portion of the route.

The alternative would encounter 54 stream crossings, an increase of fourteen over the portion of the mainline it would replace. This increase primarily occurs to intermittent stream crossings, where 18 additional crossings were encountered. Impacts to perennial streams would decrease to 14 from the 30 identified along the proposed route. Impacts to perennial streams with moderate to high significance also decrease to 13, 11 fewer than the proposed route portion. Groundwater impacts along this alternative to the Wasatch Variation would occur along four miles in the Wasatch Mountains, about two miles more than the portion of the proposed route it would replace. This difference is not considered significant.

Impacts to freshwater biology with regard to the number of sensitive stream crossings containing fish would decrease by eight to a total of six significant stream crossings if this variation were adopted.

Approximately 1,342 acres of native vegetation would be temporarily disturbed on the alternative, 96 fewer than would be impacted by the proposed action. Further, it would permanently remove 590 acres of woody vegetation. This is 22 fewer than the proposed action.

This alternative would potentially impact 116 acres of riparian habitat compared to 61 acres on the portion of the proposed route it would replace. This is a significant disadvantage. The Bountiful Peak Alternative would also temporarily disturb 520 acres of agricultural land, 382 more than the proposed route segment.

The alternative would significantly impact 499 acres of big game critical or high priority habitat versus 688 along the proposed route. No big game migration corridors would be crossed, as opposed to the 77 acres which would be impacted by the proposed route. Approximately 24 acres of upland game bird sensitive habitat would be affected by the alternative. This is 24 more acres than the proposed action. Twenty-two acres of critical waterfowl nesting areas would be affected, 14 fewer than the proposed route. A total of seven known raptor nests would be impacted by the alternative, three more than the proposed route.

The Bountiful Peak Alternative with the Wasatch Variation would impact approximately 393 acres of potential habitat of federal threatened or endangered wildlife species. This is 375 more acres than the proposed route. These 393 acres would affect bald eagle winter concentration areas and peregrine falcon hunting territory.

Impacts to socioeconomics would be similar to those discussed for the proposed action, although different counties in Utah would be involved. The alternative would not be within the Ward Canyon Utility Corridor within the Wasatch-Cache National Forest. The route is within approximately four miles of Semiprimitive Nonmotorized designated land. This area is inaccessible by vehicle. New roads would have to be approved by the Forest Service prior to construction. In several areas of steep terrain, new road construction may cause unavoidable adverse impacts to soils, land stability, and other watershed values.

The Forest Service may deny approval of new roads in these areas and specify helicopter supported construction. The alternative also parallels Skyline Drive, a road considered a Panoramaland Motor Tour road, for approximately three miles. This impact would occur during the construction phase only and would be a temporary impact.

Impacts to recreation facilities would be similar to the proposed action although impacts to campgrounds in the Uinta National Forest would not occur.

Use of the Bountiful Peak Alternative, like the Wasatch Variation and the Pages Lane and the Bountiful Boulevard Alternatives of the Wasatch Variation, would resolve the major institutional problem which faced the WyCal proposal, i.e., routing in a north-south direction across the Uinta National Forest. This problem is manifested in the Uinta's Standards and Guidelines. Use of the Bountiful Peak alternative however would not resolve the problems associated with utilization of the Wasatch Variation concerning conflicts with the Standards and Guidelines for the Wasatch-Cache National Forest. Utilization of the Bountiful Peak Alternative would still lie outside of the Ward Canyon Utility Corridor. If this alternative were selected, a Forest Plan amendment would be required. The amendment would most likely be considered a significant change in Forest Plan direction and the full planning process would be required prior to a decision to approve or reject the amendment.

Major land use advantages to the route include the fact that the Bountiful Peak Alternative would not affect any nearby homes, thus avoiding one of the problems associated with the Wasatch Variation and more so with the Bountiful Boulevard and Pages Lane Alternatives.

No high sensitivity cultural resource segments are present in either the alternative or the replaced portion of the route.

The variation has the potential to impact 1,768 acres of land containing significant paleontological formations. This is 992 more than the proposed route. While this is a disadvantage, it is considered minor because mitigation for this resource is typically highly successful.

The Bountiful Peak Alternative to the Wasatch Variation would have 12 acres of high significance impacts to visual resources as opposed to the 186 acres along the proposed route it would replace. These visual impacts will be highly visible from I-15, Farmington, and Centerville, where the route descends into Farmington, Utah.

Utilization of the Bountiful Peak Alternative of the Wasatch Variation would reduce safety concerns associated with construction in populated areas. It would alleviate the concerns associated with the Bountiful City and North Salt Lake residents.

It would not, however, alleviate problems associated with West Valley City and may at some point in the future cause problems in Centerville and Farmington. As has been previously stated, the likelihood of a pipeline rupture occurring is remote; however, the presence of nearby residences, schools and commercial businesses must be considered.

1.5.2.3.1 The Bountiful Peak Alternative (MP 38.5-57.4)

The Bountiful Peak Alternative is about 19.9 miles long; its adoption would increase the length of the Wasatch Variation by about 5.8 miles. The alternative begins at MP 38.5 of the Wasatch Variation and rejoins the variation at MP 52.6 near the northern end of the Salt Lake City International Airport runway.

Most impacts associated with the Bountiful Peak Alternative would be identical (or would differ insignificantly) to those identified for the portion of the Wasatch Variation which the alternative would replace. As a result, only those resource areas where impacts were found to be different are discussed below.

Use of the Bountiful Peak Alternative would increase the miles of landslide potential by three miles but would reduce the miles of land containing slopes greater than 30 percent by one mile. It would also increase the amount of land with soils having poor reclamation potential by 25 acres.

It would cross two fewer intermittent streams and two fewer perennial streams but would significantly impact one more perennial stream crossing than would the Wasatch Variation portion it would replace. The alternative would lessen impact to native vegetation temporarily disturbed by 28 acres, acres of woody vegetation disturbed for the life of the project by nine acres, and riparian habitat by nine acres.

The Bountiful Peak Alternative would increase disturbance to agricultural land by 95 acres, and increase by six acres the amount of big game crucial or high priority habitat impacted. It would also increase disturbance to the hunting territory of the peregrine falcon by 205 acres.

The Bountiful Peak Alternative would cross the Wasatch-Cache National Forest outside of a designated utility corridor, although in an area deemed more significant by the Forest Service than where the Wasatch Variation would cross. It would reduce recreational conflicts by completely avoiding Mueller Park but it would have new impacts to recreation associated with the Skyline Drive and to helicopter skiing.

The Bountiful Peak Alternative would have significantly fewer safety concerns than the portion of the Wasatch Variation it would replace. It would completely avoid all residential areas associated with Bountiful Hills and North Salt Lake. This is felt to be a significant advantage but may at some point in the future cause problems in Centerville and Farmington. It would not, however, avoid the potential problems associated with West Valley City.

In summary, the Bountiful Peak Alternative would resolve some of the problems of the Wasatch Variation primarily concerned with Bountiful City and their water supply and effects on large population centers. It would not resolve problems associated with landslide potential, slope steepness, erosion or watershed issues; it would merely shift these problems to a different venue.

1.5.3 WyCal North Las Vegas Variation

The WyCal route with the complete North Las Vegas Variation would involve 1,039 miles of pipeline construction. The variation was developed as an alternative to crossing the Sunrise Mountain Natural Area, Rainbow Gardens, and Las Vegas Wash. This variation would require 151 miles of pipeline compared to 118 miles from the corresponding segment of the proposed route. The variation would depart the proposed route at NL 448 and rejoin it at NL 567 at the Nevada-California border.

North Las Vegas Variation impacts would be identical to those of the proposed route or insignificantly different for the following resource areas: air quality; number of surface faults; plant species of special concern and their habitat; big game migration corridors; upland game bird sensitive and waterfowl critical nesting habitat; number of raptor nests; freshwater biology; socioeconomics, traffic, and noise; and cultural resources.

The North Las Vegas Variation would cross 11 miles of land with slope greater than 30 percent, six more than would occur along the proposed route.

The variation would impact 1,388 acres of soils with a poor potential for reclamation; this is 660 acres more than would occur along the proposed route.

Surface water impacts would increase by four with 10 stream crossings on the variation as opposed to six along the segment of the route it would replace. These additional crossings would occur on intermittent streams.

The one mile of high potential groundwater impact associated with the proposed route near Las Vegas Wash would be avoided.

The variation would temporarily disturb 1,831 acres of native vegetation, 423 more than would occur on the proposed route. An additional 208 acres of woody vegetation would be disturbed on the North Las Vegas Variation and eight more acres of riparian habitat would be impacted. No temporary impacts to agricultural land would occur along the variation, as opposed to 25 acres along the portions of the route it would replace.

Approximately 55 acres of big game crucial or high priority habitat occur along the variation, compared with none along the proposed route section it would replace.

The variation could potentially impact 908 acres of habitat for federally threatened and endangered wildlife species, 424 more acres than the proposed action. These additional acres of impact occur in desert tortoise habitat.

Impacts to recreational facilities would be reduced compared to those discussed for the proposed action. The variation would have both long and short-term impacts to Off-Road Vehicle Recreation Area 13 near Goodsprings, as well as on the Mint 400/ Frontier 500 ORV racing areas. These impacts would replace those associated with the Rainbow Gardens, Sunrise Mountain Natural Area, and the proposed Clark County Wetlands Park on the proposed route. This reduction in impact potential favors adoption of the variation.

Utilization of the North Las Vegas Variation would avoid the land use conflicts associated with the Sunrise Mountain Natural Area, the proposed Clark County Wetlands Park, and the Henderson land use plan. As has been identified in FEIR/S, II conflict with the Sunrise Mountain Natural Area is at present insurmountable. At the present time, WyCal could not, under any circumstances, legally construct across this area. Although the North Las Vegas Variation could impact Nellis AFB, use of the North Las Vegas Variation would avoid Rainbow Gardens as well as avoid crossing the Las Vegas Wash. These factors again favor adoption of the variation.

The variation has one highly sensitive cultural resource segment, the same as for the proposed route.

The North Las Vegas Variation has the potential to impact 1,692 acres of significant paleontological formations. This is 425 acres more impact than would occur along the proposed route.

No impacts to visual resources would occur on this variation since it would avoid construction through the Rainbow Gardens and the Las Vegas Wash areas. This factor favors adoption of this variation.

The North Las Vegas Variation would avoid some of the safety concerns associated with Henderson and East Las Vegas; however, the variation would pass through the Husite development and through residential areas of North Las Vegas.

1.5.4 The WyCal Proposal Best Case

In order to best determine the environmentally preferred WyCal route, a comparison of the variations must be made. Section 1.4.8 has previously indicated that Kern River would be required to use both the Wasatch and North Las Vegas Variations if certificated. The remaining variations explored in the FEIR/S were eliminated from further consideration. One of the major issues of this supplement involves the Wasatch Variation based upon concerns previously discussed. Three alternative routings through the Wasatch Front Range were explored in this document in order to determine if one of the alternatives or the Wasatch Variation as analyzed is more environmentally preferable.

1.5.4.1 The Wasatch Variations

The impacts of the Wasatch Variation and of the three alternatives to the variation have been individually discussed in Section 1.5.2 and Table 1.5-1. The significant advantages of the Wasatch Variation over the proposed mainline of Kern River have been discussed in Section 1.4.1 and 1.4.8.1.3.

Impacts of the Wasatch Variation and the alternatives were identical for the following resource areas; air quality; surface faults; groundwater; number of sensitive stream crossings; acres of threatened or endangered plants species habitat and number of species; big game migration corridors and fawning areas; upland game bird habitat and waterfowl nesting areas; raptor nesting areas, and cultural resources.

Based upon the review of the data, the Pages Lane Alternative of the Wasatch Variation would have some advantages. It had the least impact in: miles of landslide potential; miles of slope greater than 30 percent; acres with poor soil reclamation potential; intermittent stream crossings; acres of native vegetation disturbed; acres of riparian habitat disturbed; acres of disturbance to bald eagles; recreational conflicts; and land use conflicts. Disadvantages of the alternative include impacts to traffic and noise as well as safety concerns associated with placing the pipeline within a residential and commercial area.

The reason for the low level of impact upon the natural environment for the alternative is primarily due to dominance of residential and commercial areas along the impacted route. It is difficult to make comparisons between impacts to the natural environment and impacts to the social environment. Based purely on environmental grounds, the ranking of the alternatives would be 1) Pages Lane, 2) Bountiful Boulevard, 3) Wasatch Variation, and 4) Bountiful Peak. Utilizing social criteria and minimizing the amount of impact to people produces a rank order of 1) Bountiful Peak, 2) Wasatch Variation, 3) Bountiful Boulevard, and 4) Pages Lane.

On the balance, considering both natural and social environmental issues, the Wasatch Variation as it was originally discussed in the FEIR/S (Volume III) remains staff's preferred routing. As stated previously, the Wasatch Variation near Bountiful was designed to avoid the congestion and construction conflicts associated with the Bountiful Boulevard and Pages Lane Alternatives. Residential communities, as well as individual residents, historically do not welcome large projects such as this in their neighborhoods or on their property, both from a safety and land use perspective. The industry and staff have historically responded to this by avoiding such situations to the maximum extent possible. Thus, the Wasatch Variation was designed to avoid Bountiful City, even though an existing utility corridor was present. The Bountiful Peak Alternative does not resolve problems associated with landslide potential, slope steepness, erosion, or watershed issues; it would merely shift these problems to a different venue, the Centerville/Rosedale/Farmington area. Staff, however, wanted to remain open on this issue in the Draft Supplement. The staff specifically sought comments on the economic, environmental, and engineering aspects of the alternatives to the Wasatch Variation and specifically sought comments from the affected companies (Kern River and WyCal) and the cities of Bountiful, Centerville, West Bountiful, Farmington, and the other municipalities in the Salt Lake Valley area, as well as potentially affected residents, etc. After reviewing past letters to the Commission, the comments received at FERC, and the local public meeting held in Salt Lake City, as well as conversations with local agencies and officials, the following observations can be made:

- There is no consensus on the acceptability of either the Wasatch Variation or the three alternatives;
  - Davis County in a letter dated April 20, 1988, would rank the alternatives as 1) Pages Lane, 2) Grandview Peak, 3) Bountiful Boulevard, and 4) Wasatch. Davis County did not rate Bountiful Peak.
  - Davis County Planning Commission in a letter dated May 18, 1988, would rank the alternatives as 1) Porter Lane, 2) Pages Lane, 3) Grandview Peak, and 4) Bountiful Peak. Davis County Planning Commission did not rate Bountiful Boulevard. In the Salt Lake City public meeting, they reaffirmed their opposition to the Wasatch Variation.
  - North Salt Lake City requested that the Bountiful Boulevard, Wasatch, and Grandview Peak Alternatives be eliminated as possible routes. The Porter Lane, Pages, Lane, and Bountiful Peak Alternatives were acceptable to them. (The latter three all avoid North Salt Lake City.)
  - The City of West Bountiful opposes Pages Lane.

- The City of Centerville opposes both the Pages Lane and Bountiful Peak Alternatives, both from a safety viewpoint as well as underground utility congestion under Pages Lane.

- The City of North Salt Lake has adopted a resolution opposing the Wasatch Variation.

- The City of Bountiful now indicates it is opposed to any of the variations, particularly the Pages Lane and Bountiful Boulevard Alternatives, even though it had proposed them originally.

- The Kearns Town Council is in favor of the Wasatch Variation routing through its town.

- The Bountiful Hills Residents and Concerned Citizens Association appears to be opposed to all route variations and alternatives.

- The Utah Chapter of the Sierra Club appears to be opposed to any route which deviates from established utility corridors on Forest Service land where such corridors exist. Staff interprets this as supporting the Bountiful Boulevard and Pages Lane Alternatives but not the Wasatch Variation, Bountiful Peak, or the proposed Kern River/WyCal route through Uinta National Forest.

o The U.S. Forest Service still opposes the proposed route through the Uinta National Forest;

o It is not apparent that the local officials in and around the Salt Lake City/Bountiful area and the Forest Service have yet recognized the need for and benefit of discussing with one another their respective concerns, particularly as they relate to the potential environmental impacts associated with the proposed route in the Uinta National Forest, the reasons why the Wasatch Variation was developed, and the legitimate questions which have been raised about the variation. (This need was stressed by FERC staff at the Salt Lake City public meeting.)

o The cost estimates presented by the three competing applicants all vary, but all agree that the alternatives would cost more than the Wasatch Variation. No one else provided cost estimates;

o Construction progress in either Pages Lane or Bountiful Boulevard would be extremely slow due to the existing utility line congestion. Construction could take up to two months in these areas;

o Everyone is generically concerned over public safety associated with the construction and operation of a large diameter natural gas pipeline in residential/commercial areas.

The applicants and staff each maintain that natural gas pipelines can be constructed and operated through such areas in a safe manner. The pipeline industry safety record supports this;

- o Residences and commercial shop owners along Pages Lane or Bountiful Boulevard were not approached by city officials of Bountiful to discuss the alternatives that the city proposed to FERC;

- o The previous concerns of Salt Lake City appear to be resolvable (see discussion on page 1-9 of the Introduction of Vol. VI). This would also appear true of the concerns previously raised by West Valley City.

As with any analysis, there must be an "ending" or conclusion and the clearest conclusion here is that "there is no alternative that pleases everyone." As pointed out in our very first observation, there is no consensus of opinion - just different ones. The staff concludes that none of the alternatives offer any clear and significant advantages over the Wasatch Variation. The staff, therefore, recommends that the Wasatch Variation be included as part of the WyCal (and Kern River) proposals.

1.5.4.2 The Nevada Variation

The North Las Vegas Variation has been previously identified in Section 1.4.8.2 as being the environmentally preferable route for the Kern River proposal. This selection was made primarily to avoid the insurmountable land use conflicts associated with the Sunrise Mountain Natural Area. This same conflict would exist for the WyCal proposed route. Even though the WyCal North Las Vegas Variation would be approximately 41 miles longer than the Kern River variation, the benefits of the variation are still present and thus the North Las Vegas Variation is also the preferable route for the WyCal proposal.

1.5.4.3 The California Variation

The western leg of the WyCal proposed route involves utilization of the Mojave route as it was presented in Section 1.2.7. This would include use of Alternative B. Alternative B was selected as the preferable route to place the Mojave mainline within a designated utility corridor through the California Desert Conservation Area between Pisgah and Boron. This alternative is also the preferred routing for the WyCal western leg segment for the same reasons.

1.6 INTERSTATE SYSTEMS COMPARISONS

This portion of the comparison deals with the best case scenarios of each of the three interstate pipeline proposals and the El Dorado Alternative. As stated in Section 1.2.6, the Mojave System C with Alternative B represents the environmentally preferable routing for Mojave. This system includes the 100 MMcfd case for Northwest, the 100/500 MMcfd case for El Paso, and the Mojave proposal. This route would entail construction of 587 miles of pipeline. The El Dorado routes were compared in Section 1.3.7. Since the El Dorado pipeline would receive gas in the same manner as the Mojave proposal, the System C route discussed above represents the best system routing. This El Dorado route would also entail construction of 587 miles of pipeline.

The Kern River proposal and variations to the proposed route were compared in Section 1.4.8. This comparison indicates that the Kern River route utilizing both the Wasatch and North Las Vegas Variations represents the environmentally best route. The Kern River routing would entail 867 miles of pipeline construction.

The WyCal proposal and variations to the proposed route were compared in Section 1.5.4. This comparison indicates that the WyCal route utilizing the Wasatch and North Las Vegas Variations on the northern leg and Mojave's Alternative B on the western leg represents the environmentally best route. The WyCal routing, including construction associated with the supply from El Paso, would entail 1064 miles of pipeline construction.

All of the routes in this comparison, therefore, would require somewhere between 587 and 1064 miles of pipeline across a multitude of terrain, geologic, vegetative, and wildlife habitat types. The main categories for comparisons of the routes remain unchanged from those discussed above. Table 1.6-1 lists the impacts for each of the routes.

Impacts to air quality would be roughly equivalent for all four interstate systems. The El Dorado system involves two new compressor stations, the Mojave and Kern River systems would require three each, and the WyCal system would require four compressor stations. All projects would have significant beneficial air quality impacts in the Kern County area.

Impacts to geology would be equivalent for the Mojave and El Dorado systems based on miles of landslide potential and the number of surface fault ruptures. The Mojave system route, however, would have 12 fewer miles of slope greater than 30 percent than the El Dorado route. The Kern River route would cross 23 faults, 136 miles of areas with landslide potential, and would traverse 215 miles of slope greater than 30 percent. The WyCal route would cross 36 faults, 122 miles of areas with landslide potential, and would traverse 208 miles of slope greater than 30 percent.

Table 1.6-1

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C 1/ with Alternative B	Proposed El Dorado System A	Preferable El Dorado 2/ System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
AIR QUALITY	NSI 3/	NSI	NSI	NSI	NSI	NSI	NSI	NSI
GEOLOGY								
Surface fault rupture	18	16	18	16	23	23	35	36
Miles of landslide potential	27	80	27	80	163	136	149	122
Miles of slope greater than 30%	69	45	82	57	229	215	214	204
SOIL								
Acres of poor reclamation potential	4768	3483	4343	3052	4882	4324	6176	5969
SURFACE WATER								
Number of stream crossings	74	68	68	61	135	138	161	172
Intermittent stream crossings	71	65	65	58	83	102	96	122
Perennial stream crossings	3	3	3	3	52	36	54	38
Moderate/high significance perennial stream crossings	0	0	0	0	39	27	45	33
GROUNDWATER								
Miles of potential impact	30	17	15	7	10	11	30	26
FRESHWATER BIOLOGY								
Number of sensitive stream crossings with fish present	0	0	0	0	13	7	17	9
TERRESTRIAL BIOLOGY								
Vegetation								
Total acres of native vegetation temporarily disturbed	8465	6561	8549	6697	8646	8736	10917	11270

Table 1.6-1 (continued)

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C 1/ with Alternative B	Proposed El Dorado System A	Preferable El Dorado 2/ System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
Vegetation (continued)								
Acres of woody vegetation kept cleared for the life of the project	1765	1774	1838	1797	2920	3028	3858	4353
Acres of riparian habitat crossed	61	60	24	24	98	148	183	254
Acres of federally threatened or endangered plant habitat affected	60	0	60	0	0	0	0	0
Number of species	1	0	1	0	0	0	0	0
Acres of California classified plant habitat affected	947	947	947	947	536	536	947	947
Number of species	3	3	3	3	4	4	3	3
Acres of agricultural land temporarily disturbed	767	731	525	489	1561	1846	1288	1550
Wildlife								
Big game crucial or high priority habitat (acres)	748	564	748	564	1350	1155	1423	1283
Big game migration corridors (acres)	121	121	121	121	162	48	211	134
Big game fawning/ calving areas (acres)	56	0	56	0	0	0	0	0
Upland game bird sensitive habitat (acres)	0	24	0	24	404	428	335	359
Critical waterfowl nesting areas (acres)	0	0	0	0	60	46	60	46
Raptor nesting areas (nests)	0	0	0	0	12	15	18	21
Acres of potential threatened or endangered animal habitat affected	9615	9467	8819	8799	8404	8341	9283	9922

Table 1.6-1 (continued)

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C 1/ with Alternative B	Proposed El Dorado System A	Preferable El Dorado 2/ System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
Wildlife (continued)								
Yuma clapper rail	151	36	97	36	0	0	127	127
Bald eagle	187	72	169	115	121	168	284	331
Peregrine falcon	490	60	490	121	0	120	163	283
Whooping crane	0	0	0	0	0	0	0	0
California condor	1355	1355	1492	1492	1560	1560	1355	1355
Blunt nosed leopard lizard	517	517	388	388	339	339	517	517
Tehachapi slender salamander	18	18	0	0	3	3	18	18
Desert tortoise	3032	3274	2756	2998	3716	3837	3659	4083
San Joaquin kit fox	647	647	410	410	333	333	647	647
Black-footed ferret	1345	1567	1345	1567	600	600	640	640
Utah prairie dog	0	0	0	0	0	0	0	0
Mohave ground squirrel	727	775	667	667	751	751	727	775
Nelson's antelope squirrel	412	412	412	412	290	290	412	412
Tipton kangaroo rat	24	24	24	24	24	24	24	24
Short-nosed kangaroo rat	410	410	436	436	290	290	410	410
Giant kangaroo rat	300	300	133	133	177	177	300	300
SOCIOECONOMICS								
Population change >10%	No	No	No	No	No	No	No	No
Total employment change >10%	No	No	No	No	No	No	No	No

Table 1.6-1 (continued)

INTERSTATE SYSTEMS COMPARISONS

	Proposed Mojave System A	Preferable Mojave System C [1] with Alternative B	Proposed El Dorado System A	Preferable El Dorado [2] System C	Proposed Kern River	Preferable Kern River with Wasatch and North Las Vegas Variations	WyCal with El Paso Base Case	Preferable WyCal with the Wasatch, North Las Vegas, and Alternative B Variations, with El Paso Base Case
SOCIOECONOMICS								
Income change >10%	No	No	No	No	No	No	No	No
Vacancy rates of temporary housing <5%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local tax base change >10%	5 counties	1 county	5 counties	1 county	7 counties	6 counties	7 counties	6 counties
Traffic	NSI	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Operational Noise	NSI	NSI	NSI	NSI	NSI	NSI	NSI	NSI
Recreation (conflicts)	5	4	3	2	6	4	8	8
LAND USE/OWNERSHIP conflicts	9	5	6	3	5	2	13	9
CULTURAL RESOURCES								
Number of sites in the direct impact zone	82	88	86	95	77	81	109	106
NRHP listed or eligible sites in the direct impact zone	2	2	2	2	4	4	6	6
Percentage of line actually surveyed or survey coverage within analysis corridor	6	12	12	15	5	6	6	10
High sensitivity segments	8	9	9	9	9	9	8	8
PALEONTOLOGY								
Acres of impact to significant formations	3205	2571	2935	2454	6119	7240	6458	7670
VISUAL RESOURCES								
Acres of high visual impact	0	0	318	318	470	236	263	29

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[1] Mojave System C = Mojave/El Paso (100/500)/Northwest (100)

[2] Alternative B keeps Mojave within the desert corridor near Barstow, California
El Dorado System C = El Dorado/El Paso (100/500)/Northwest (100)

[3] NSI = No Significant Impacts

Soils impacts would be greatest on the WyCal system, followed by the Kern River system. This is due to a combination of the number of miles of slope greater than 30 percent and the generally poor revegetation potential caused by the climatic regime across Utah, Nevada, and California. The El Dorado route would encounter the fewest number of acres with poor reclamation potential. The Mojave proposal is intermediate.

Impacts to surface water would vary significantly among the routes. The Mojave and El Dorado systems would only cross three perennial streams and these crossings would not cause significant impacts. The Kern River route would cross 36 perennial streams; 27 of these stream crossings have the potential to be significantly impacted. The WyCal route, on the other hand, would cross 38 perennial streams with 33 of the streams having a potential to be significantly impacted. Some of these impacts can be successfully mitigated; however, it is doubtful that all of the impacts can be mitigated on either the WyCal or Kern River routes.

The WyCal route would have the greatest number of miles of medium to high impacts to groundwater (26). The Mojave route would have 17 miles of medium to high impacts to groundwater. The Kern River route could potentially impact 11 miles of sensitive groundwater areas and the El Dorado route could potentially impact seven miles of sensitive groundwater areas. As stated previously, significant impact to groundwater is very unlikely.

Impact to aquatic species would occur on the WyCal and Kern River routes only. Nine sensitive stream crossings would occur on the WyCal route while only seven streams would be crossed by Kern River. Although some mitigation measures may reduce these impacts, the mitigation measures would not be sufficient to reduce the impacts to insignificance.

Impacts to native vegetation temporarily disturbed would vary from a low of 6,561 acres for Mojave to 11,270 acres for WyCal (see Table 1.6-1). Permanently removed woody vegetation for the routes would be distributed in a similar manner. The WyCal route would impact 4,353 acres, significantly more than the 3,028 acres on the Kern River route, the 1,774 acres on the Mojave route and the 1,797 acres on the El Dorado route. Significant differences also exist among the routes with regard to acres of riparian habitat crossed. The El Dorado route would cross 24 acres, the Mojave 60 acres, the Kern River 148 acres, and the WyCal 254 acres.

None of the routes would impact any federally threatened or endangered plant species nor would they impact any suitable habitat of federally listed plant species.

The Kern River route does have the potential to impact four species of California listed plants and would pass through 536 acres of suitable habitat. The El Dorado, Mojave, and WyCal routes, on the other hand, could impact three California listed plant species, but would pass through 947 acres of suitable habitat.

The El Dorado route would temporarily disturb the least amount of agricultural land, 489 acres. Mojave and WyCal would disturb 731 and 1,550 acres respectively, and Kern River would disturb 1,846 acres. All of these impacts, however, would represent a temporary disturbance, generally only during one growing season.

El Dorado would affect 273 acres of orchards and vineyards for the life of the project. Kern River would remove 242 acres of orchards and vineyards for the life of the project. The Mojave and WyCal routes would each remove 158 acres of orchards and vineyards for the life of the project.

Wildlife impacts have been divided into two subcategories: general wildlife disturbance and disturbance to threatened or endangered species. Impacts to general wildlife species would occur to big game critical habitat (564 acres), big game migration corridors (121 acres), and upland game bird sensitive habitat (24 acres) on both the Mojave and El Dorado routes. The Kern River route would impact big game critical habitat (1,155 acres), big game migration corridors (48 acres), big game upland game bird sensitive habitat (428 acres), critical waterfowl nesting areas (46 acres), and 15 raptor nests. The WyCal route would impact 1,283 acres of big game critical habitat, 134 acres of big game migration corridors, 359 acres of upland game bird sensitive habitat, 46 acres of critical waterfowl nesting areas, and 21 raptor nests.

The Kern River route has the fewest impacts to threatened or endangered wildlife species. The Kern River route could impact 12 federal or California state listed species and would cross 8,341 acres of suitable habitat. The El Dorado route could impact 13 federal or California state listed species and could cross 8,799 acres of suitable habitat. The Mojave route could impact 14 federal or California state listed species and could cross 9,467 acres of suitable habitat. The WyCal route could also impact 14 federal or California state listed species and could cross 9,922 acres of suitable habitat.

Socioeconomic impacts would be roughly equivalent along all four of the routes. The Kern River and WyCal routes would have positive impacts to six counties, increasing the tax base by more than 10 percent. One county would receive a positive impact to the tax base from the Mojave or El Dorado routes. Other positive socioeconomic impacts would occur for all four projects in the areas of employment and income benefits. No significant impacts would occur on any of the routes concerning traffic or noise. The noise levels around the compressor stations all of the projects will add to the ambient noise levels.

WyCal could conflict with eight recreation areas, followed by five conflicts on Mojave. Kern River could conflict with four recreation areas. The El Dorado route could conflict with only two recreational areas.

The WyCal route would conflict within land use concerns in nine areas. Mojave would involve five land use conflicts. The El Dorado route would conflict with land use in three areas. Kern River would involve two land use conflicts.

Cultural resource impacts are difficult to determine prior to completion of a Class III inventory survey. The Kern River route contains two 25-mile long segments with a very high sensitivity rating and seven segments with a high sensitivity rating. The WyCal route also contains two segments with a very high sensitivity, but only has six segments with a high sensitivity rating. Mojave and El Dorado, on the other hand would have nine segments with a high sensitivity rating. The Kern River route would directly impact fewer known sites than either the Mojave, El Dorado, or WyCal routes (see Table 1.6-1). The WyCal route contains six NRHP sites in the direct impact zone, two more than Kern River and four more than either Mojave or El Dorado.

Potential paleontological impacts would be less severe along the El Dorado route (2,454 acres) than either the Mojave (2,571 acres), Kern River (7,240 acres), or WyCal (7,670 acres) routes.

Significant impacts to visual resources occur on all of the routes with the exception of the Mojave route. The impacts on the Kern River or WyCal routes may require significant mitigation measures to reduce the impacts to acceptable levels.

System safety concerns are present on all four of the routes. The impacts of pipeline rupture, although a remote possibility, would be most damaging along the Wasatch Variations of both WyCal and Kern River.

Based on the data presented in the FEIR/S, staff stated that each of the Mojave/Kern River/El Dorado routes had environmentally superior components. The Mojave route would cause fewer significant impacts to geology, general vegetation, and visual resources. The El Dorado route would cause fewer significant impacts to soils, riparian vegetation, agricultural land, recreation, and paleontology. The Kern River route would cause fewer significant impacts to groundwater, threatened and endangered plants and wildlife,land use, and number of cultural resources currently identified in the direct impact zone. El Dorado and Mojave would cause similar impacts to freshwater biology, general game species wildlife, surface water, and cultural resources sensitivity segments, but significantly less impact than would Kern River. There would be no significantly different impacts on air quality or socioeconomics among the four routes.

Now comes WyCal. On a simple comparative basis, it is clear that WyCal has more environmental impacts than each of the other separate proposals. WyCal, on the other hand, has already committed to adopting all but two of the mitigating measures recommended in Volume III of the FEIR/S, whereas, Kern River and Mojave have not made this commitment but probably would accept such measures as conditions to a FERC certificate authorizing their respective projects. This WyCal commitment, however, is significant, particularly when many of the potential impacts will be significantly mitigated by those measures. This hesitancy to adopt staff measures was one of the bases for the U.S. Fish and Wildlife Service (FWS) to issue a jeopardy opinion for the proposed Kern River, Mojave, and El Dorado projects, i.e., the FWS did not know what measures the applicants were willing to accept or reject. (See page 7 of the Biological Opinion, FEIR/S, II/Appendix G.) It is staff's opinion that the WyCal project, by adopting staff's recommendations (including those of BLM, the Forest Service, and the FWS) does not have the biological jeopardy opinion that the other applicants still have until the Commission adopts staff's recommendations.

WyCal has suggested that since the FEIR/S concluded that on environmental grounds the Kern River or Mojave systems could be made acceptable (via staff's recommended mitigation measures contained in Volume III of the FEIR/S), the WyCal proposal would also be acceptable on environmental grounds since its proposal is simply a combination of the other two acceptable routes. It can also be viewed that because WyCal proposes to receive gas from both the supplies of Kern River and Mojave, it offers more flexibility of service and that the cost for this increased flexibility is additional impact to environmental resources. Mojave disagreed in its comments stating that there has been no showing that WyCal would provide increased flexibility and thus Mojave can provide necessary service from virtually any producing area in the continent.

2.0 INTRASTATE SYSTEM ALTERNATIVES COMPARISON ANALYSES

2.1 THE INTEGRATED INTRASTATE SYSTEM ALTERNATIVE

Both PG&E and SoCal have presented flow diagrams indicating that under existing contract capacity, they have the capability of supplying at least 690 MMcfd from the California/Arizona border to the EOR market as an integrated intrastate system with no additional facility requirements through 1994-1995. Although the intrastate companies have indicated that toward the end of the decade, they will require additional facilities to serve the full amount, this is probably also true for El Paso, Northwest, and Transwestern. This supply would be provided to PG&E and SoCal by Transwestern and El Paso utilizing existing capacity since the intrastates have specified they would serve the market through existing entitlements.

This system would require the equivalent of the Mojave Transfer Line. It could also require the addition of up to 2,000 hp of compression by turbocharging existing compressors at the Hinkley Compressor Station on PG&E's system. Addition of compression makes the system capable of transporting at least 700 MMcfd through 1994-1995 and therefore it is included to compare the system to Kern River. The compression is unnecessary for a comparison to Mojave or El Dorado. This will be referred to as the Integrated Intrastate System.

Table 2.1-1 provides a summary of impacts on the integrated intrastate system.

2.2 THE EAST LAS VEGAS/INTEGRATED INTRASTATE SYSTEM ALTERNATIVE

The East Las Vegas Alternative was suggested by the FERC staff as a possible means of reducing pipeline mileage associated with Kern River's proposed route between Las Vegas, Nevada, and Bakersfield, California. This alternative would follow the proposed Kern River route including the Wasatch Variation to a point north of Henderson, Nevada, at MP 514 (MP 491 of the proposed route) and then extend due south to a point west of Camino, California; it basically would follow the route originally proposed by the Rocky Mountain Pipeline Project (RMPP), and now WyCal.

The final 15 miles of this alternative would intersect major intrastate transmission facilities owned by SoCal and PG&E. The gas would be delivered to both of these systems which would operate in an integrated fashion using spare capacity to transport the gas 260 miles westward to the Bakersfield area.

Table 2.1-1

INTRASTATE SYSTEMS ALTERNATIVES SUMMARY OF IMPACTS

	Integrated Intrastate System	East Las Vegas System
AIR QUALITY	NSI[1/] 1 station [2/]	NSI 3 stations [2/]
GEOLOGY		
Surface fault rupture	0	9
Miles of landslide potential	0	115
Miles of slope greater than 30 %	0	185
SOIL		
Acres of poor reclamation potential	162	2846
SURFACE WATER		
Number of stream crossings	3	108
Intermittent stream crossings	3	71
Perennial stream crossings	0	38
Moderate/high significance perennial stream crossings	0	27
GROUNDWATER		
Miles of potential impact	0	12
FRESHWATER BIOLOGY		
Number of sensitive stream crossings with fish present	0	7
TERRRESTRIAL BIOLOGY		
Vegetation		
Total acres of native vegetation temporarily disturbed	206	5864
Acres of woody vegetation kept cleared for the life of the project	103	1169
Acres of riparian habitat crossed	1	137
Acres of federally threatened or endangered plant species habitat affected	0	0
Number of species	0	0
Acres of California classified plant species affected	0	66
Number of species	0	2

Table 2.1-1 (continued)
INTRASTATE SYSTEMS ALTERNATIVES SUMMARY OF IMPACTS

	Integrated Intrastate System	East Las Vegas System
Vegetation (continued)		
Acres of cropland temporarily disturbed	0	1338
Wildlife		
Big game crucial or high priority habitat (acres)	0	1155
Big game mitigation corridors (acres)	0	85
Big game fawning/ calving areas (acres)	0	0
Upland game bird sensitive habitat (acres)	0	428
Waterfowl critical nesting areas (acres)	0	46
Raptor nesting areas (nests) affected	0	14
Acres of potential threatened or endangered animal habitat	502	1475
Yuma clapper rail	103	0
Bald eagle	103	186
Peregrine falcon	103	0
Whooping crane	0	0
California condor	0	0
Blunt-nosed leopard lizard	0	0
Tehachapi slender salamander	0	
Desert tortoise	193	689
San Joaquin kit fox	0	0
Black-footed ferret	0	600
Mohave ground squirrel	0	0
Nelson's antelope squirrel	0	0
Tipton kangaroo rat	0	0

Table 2.1-1 (continued)
INTRASTATE SYSTEMS ALTERNATIVES SUMMARY OF IMPACTS

	Integrated Intrastate System	East Las Vegas System
Wildlife (continued)		
Short-nosed kangaroo rat	0	0
Giant kangaroo rat	0	0
SOCIOECONOMICS		
Population change >10%	No	No
Total employment change >10%	No	No
Income change >10%	No	No
Vacancy rates of temporary housing <5%	Yes	Yes
Local tax base change >10%	No	Yes
Traffic	NSI	NSI
Operational noise	NSI	NSI
Recreation (conflicts)	1	1
LAND USE/OWNERSHIP		
Conflicts	3	7
CULTURAL RESOURCES		
Number of sites in the direct impact zone	0	59
NRHP listed or eligible sites	0	2
Percentage of line actually surveyed	22	<4
High sensitivity segments	0	5
PALEONTOLOGY		
Acres of impact to significant formations	0	5520
VISUAL RESOURCES		
Acres of high visual impact	0	165

1/ NSI = No Significant Impacts

2/ Turbocharging at existing Hinkley Compressor Station is only needed to make this alternative comparable to Kern River; it is not needed as an alternative to Mojave or El Dorado. The East Las Vegas Alternative would require three new compressor stations plus turbocharging at Hinkley.

Use of the East Las Vegas Alternative would substitute 105 miles of pipeline construction between Las Vegas and the Camino area for the 271 miles proposed by Kern River. Again, the FERC staff has included the addition of up to 2,000 hp of compression by turbocharging existing compressors at the Hinkley Compressor Station on PG&E's system. Table 2.1-1 provides a summary of impacts on the East Las Vegas System Alternative.

2.3 NORTHWEST/PGT/INTEGRATED INTRASTATE SYSTEM ALTERNATIVE

This alternative was developed by the FERC staff to explore the feasibility of providing the EOR/cogeneration industry with direct access to major sources of natural gas in western Canada and the southwest/southcentral United States by way of existing transmission systems without construction of a major new system as proposed by Kern River. The alternative would use two major gas transmission corridors linking production regions with the Bakersfield area. One corridor would extend south from Canada through Idaho, Washington, Oregon, and California along interstate and intrastate pipelines owned by Northwest, PGT, and PG&E. The other corridor extends between west Texas and southern California using the pipeline systems owned by Transwestern or El Paso to interconnect with PG&E and SoCal at the California border.

This system alternative would not require additional facilities along either corridor; therefore, there are no impacts to enter in Table 2.1-1.

2.4 COMPARISONS OF THE INTRASTATE SYSTEMS

The impacts to the various intrastate systems were presented in Table 2.1-1. The Integrated Intrastate System has essentially been analyzed in both the Mojave (Section 1.2) and El Dorado (Section 1.3) sections. The East Las Vegas System was essentially analyzed in Section 1.4. The Northwest/PGT Integrated Intrastate System has not been previously analyzed since it involves no facility construction. Because it involves no construction, it would involve no significant impacts. Therefore it is clearly environmentally superior and need not be compared below.

The air quality impacts for each of the intrastate system alternatives would conform with all applicable federal and state laws. The East Las Vegas System would require three new compressor stations plus turbocharging existing units at the existing PG&E compressor station at Hinkley, California. The Integrated Intrastate System would only require the upgrading at the Hinkley station.

Impacts to geology would vary along the two systems. The Integrated Intrastate System would cross no surface faults, potential landslide areas, or terrain with more than 30 percent slope. The East Las Vegas System would cross 9 faults, 115 miles of potential landslide areas, and 185 miles of slope greater than 30 percent.

Impacts to soils would occur along both of the system routes. The East Las Vegas System would have the greater impact, disturbing 2,846 acres, followed by the Integrated Intrastate System with 162 acres of disturbance.

Surface water impacts would vary widely along the system routes. The most pertinent categories in Table 2.1-1 would be perennial stream crossings and moderate/high significance stream crossings. Using these two categories, the East Las Vegas System with the Wasatch Variation would cross 37 perennial streams and would have significant impacts to 27 stream crossings. The Integrated Intrastate System B would cause no significant impacts to streams.

Impacts to groundwater vary widely among the routes. The Integrated Intrastate System would cross no miles of sensitive area whereas the East Las Vegas would cross 12 miles. Since groundwater impacts can be easily mitigated, each of the systems would be acceptable.

Only the East Las Vegas System would have impacts to freshwater biology. This route would cause significant impacts to seven sensitive streams.

Impacts to vegetation can be divided into two subcategories: general vegetation disturbance and impacts to threatened and endangered plant species. Impacts to general vegetation would be generally dependent on the miles of construction (see Table 2.1-1). Based on these figures the Integrated Intrastate System route would have fewer impacts than the East Las Vegas System.

Impacts to threatened or endangered plant species would be in general more significant than those to general vegetation. Neither route would impact federally endangered plants, but only the East Las Vegas System would impact California state listed plants and plant habitat.

Wildlife impacts can also be divided into two subcategories: general wildlife disturbance and disturbance to threatened or endangered species. From a general wildlife perspective the Integrated Intrastate System route would cause fewer impacts to wildlife game species than the East Las Vegas System.

Impacts to threatened or endangered wildlife species would occur on both of the system routes. Except for the Yuma clapper rail and peregrine falcon, the East Las Vegas System would have the potential for more impact on each species as the Integrated Intrastate System route.

Socioeconomic impacts would be minimal along both of the system routes. The East Las Vegas System would have beneficial impacts to seven counties with regard to changes in the county tax base. The Integrated Intrastate System would have beneficial impacts to one county. No significant impacts would occur to traffic along either of the system routes.

The East Las Vegas System would require four new compressor station locations versus none for the Integrated Intrastate System. The Integrated Intrastate System would have less noise impact than the East Las Vegas system.

Conflicts to recreation facilities would occur along both the routes. These conflicts would be temporary in nature and should not occur beyond the construction phase.

Both of the routes would encounter land use conflicts. The Integrated Intrastate System would have three land use conflicts. There would be seven land use conflicts on the East Las Vegas route.

Impacts to cultural resources are difficult to determine prior to the staking of the route. The Integrated Intrastate System would contain no segments with a high sensitivity rating while the East Las Vegas System would contain two very high and three high sensitivity segments. The East Las Vegas System would impact at least 60 sites within the ROW as mapped. There are no known sites on the Integrated Intrastate System. The East Las Vegas System could potentially affect two NRHP properties, as opposed to none on the Integrated Intrastate System.

Impacts to paleontology would be nonexistent on the Integrated Intrastate System whereas the East Las Vegas System could affect 5,520 acres.

Finally, significant impacts to visual resources would not occur along the Integrated Intrastate System. The East Las Vegas System would cause significant impacts to 165 acres of scenic areas.

Based on all of the data presented above, the Northwest/PGT Integrated Intrastate System would cause no significant impacts. This route would be far superior to any of the intrastate systems discussed above, since no construction would be required to transport natural gas into the California market. The next best route would be the Integrated Intrastate System. The main disadvantage to this route involves potential land use problems.

The worst intrastate route alternative from an environmental perspective would be the East Las Vegas System. This route would require the most new compressor stations, has the most difficult terrain from a geological perspective, would have significant impacts to surface water and freshwater biology, would impact larger areas of big game habitat, and would impact more acres of potential threatened or endangered species.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Information provided by the applicants and further developed from field investigations, literature research, special studies, and contacts with local, state and federal agencies indicate that construction and operation of any of the proposed interstate natural gas pipeline projects would have limited, although in some cases significant, adverse environmental impact and that the proposed projects as stated in Section 1 of Volume III are environmentally acceptable, assuming the FERC finds sufficient need for such a project.

Several total system alternatives were investigated. The Mojave System utilizing the El Paso 600 MMcfd and Northwest 100 MMcfd expansions (System C) would entail 587 miles of pipeline construction. The main advantage of this system is that only 230 miles of pipeline would need to be constructed totally outside of existing ROW. Since the El Paso and Northwest expansions would involve looping of existing lines, the impacts to these areas would not be as great as would occur if these expansions involved totally new lines. A possible exception to this statement could be potential impacts to cultural resources.

The main disadvantages to construction of the looping projects involve impacts to the environment with regard to vegetation, wildlife, and cultural resources. These impacts, although they occurred during previous construction, would be increased for the expansions. Most of these impacts could be significantly reduced if the mitigation measures discussed in Section 4 of the FEIR/S were employed; however, certain impacts would be unavoidable.

Significant impacts caused by the construction of the proposed Mojave System across California would include effects on soils, native vegetation, wildlife, land use, and cultural resources.

The El Dorado system alternative would utilize the same facilities outside of California as were discussed for Mojave. Essentially, the El Dorado route would cause the same types of impacts as were discussed for Mojave. El Dorado would have fewer long-term impacts on air quality and noise since one less compressor station would be required.

The Kern River system utilizing both the Wasatch and North Las Vegas Variations would be approximately 867 miles long. The main disadvantage of this system is that all of the route would entail new construction. Portions of the route would parallel existing ROWs and utility corridors, and in some instances, use existing ROWs.

Other major disadvantages of the Kern River route include the construction of three new compressor stations causing impacts to both air quality and noise, slope stability problems and seismic hazards along the Wasatch Variation, impacts to soil, impacts to both surface water and freshwater biology, impacts to vegetation and agricultural land, impacts to paleontological resources, incompatibility with land use plans and recreation, and new impacts to visual resources.

The Kern River Mainline and variations are not consistent with the Land and Resource Management Plan for the Wasatch-Cache and Uinta National Forests. If a proposed project cannot be made consistent with the Plan by mitigation, then the Plan would have to be amended before the Forest Service could concur with the issuance of a right-of-way grant. The Forest Service's decision on whether to amend the affected Plan will be based on the project EIR/EIS, FERC's certification decision, and additional analysis, where needed. The Forest Service has prepared Erosion Control, Revegetation and Restoration Guidelines and General Mitigation Measures that will apply to National Forest System lands. These guidelines and measures would become part of the BLM ROW grant and notices-to-proceed; and compliance to these items during and after construction would be carried out by Forest Service representatives. Refer to FEIR/S, I/4.10.1 for these items.

The major advantage of the Kern River system route with the Wasatch and North Las Vegas Variation includes fewer impacts to threatened and/or endangered plant and wildlife species, and land use.

The WyCal system utilizing the Wasatch and North Las Vegas Variations, as well as the Mojave Alternative B, with some gas supplied by the El Paso Base Case would be approximately 1064 miles long. The main disadvantages of the route are similar to those of the Kern River system, e.g., primarily new construction for the entire route, construction of four new compressor stations causing impacts to both air quality and noise, slope stability problems and seismic hazards along the Wasatch Variation, as well as all of the other disadvantages discussed above for the Kern River system. In addition to all of the Kern River impacts discussed in this volume, the WyCal system also has all of the impacts associated with the Mojave proposal in the state of California. In an environmental sense, WyCal embodies the best and worst of both the Kern River and Mojave Projects.

In the FEIR/S, the environmental staff felt that on environmental grounds any of the then proposed systems could be made acceptable, although with certain systems this may be more difficult than with others. This should not be construed to imply that there are no impacts or that the impacts are benign. It was also stated that economic and other non-environmental factors may play an important role in determining which of these projects would be best and that consideration of these factors was beyond the scope of the FEIR/S and would be given full consideration in the later phases of the FERC certification process.

Nevertheless, the environmentally preferred interstate proposal was and is still the Mojave System with route modifications described in the FEIR/S. This conclusion is based on two major premises: (1) these systems would involve significantly less environmental impact, even if built with all supply projects as proposed; and (2) the supply projects of El Paso and Transwestern could be phased to match actual market requirements as the EOR/cogeneration market evolves. El Dorado is an alternative route but no longer a competitor to Mojave. Where its route has some advantages over the Mojave Proposal, it is recommended.

Premise 1

The first premise results from the fact that Kern River and WyCal systems entail substantially more miles of pipeline construction and substantially more compression, cross sensitive environmental areas, cross areas which the Forest Service has emphasized (and the staff agrees) would be difficult to construct and maintain without long-term environmental impact, and are not immediately adjacent to existing utilities to the extent of the other systems.

The WyCal route would involve the greatest geological impacts, including surface fault rupture and miles of slope greater than 30 percent; soils; surface water, including number of stream crossings, intermittent stream crossings, perennial stream crossings, and significant stream crossings; freshwater biology; vegetation, including total acres of native vegetation temporarily disturbed, acres of woody vegetation kept cleared for the life of the project, and acres of riparian habitat disturbed; wildlife, including acres of big game critical or high priority habitat affected, big game migration corridors affected, and number of raptor nesting areas affected; threatened or endangered animal habitat affected; recreation and land use conflicts; paleontological resources; and cultural resources.

Based on the number of impacts, the Kern River route lies somewhere in between Mojave and WyCal with the greatest impacts to miles of landslide potential and temporary disturbance of agricultural land.

In the case of the Mojave proposal or El Dorado Alternative systems, no areas of significant construction or maintenance difficulty would be involved on the recommended routes, and major portions of the routes would be immediately adjacent to existing pipeline ROW. In addition, the supply lines would be entirely adjacent to existing pipelines and would share significant portions of previously disturbed ROW.

The Mojave system would have greater impacts to air quality and noise than the El Dorado system. It would also have marginally greater impacts to soils; surface water, including number of stream crossings; groundwater; acres of agricultural land temporarily disturbed; acres of potential threatened or endangered animal habitat affected (Tehachapi slender salamander, desert tortoise, blunt-nosed leopard lizard, San Joaquin kit fox, Mohave ground squirrel, and giant kangaroo rat); recreation conflicts; land use conflicts; and paleontological resources.

The El Dorado Alternative system would have greater impacts due to miles of slope greater than 30 percent, acres of riparian habitat crossed, impacts to California condor, bald eagle, short-nosed kangaroo rat, and peregrine falcon, cultural resources, and visual resources than would the Mojave system.

When compared to Kern River, the Mojave, El Dorado, and WyCal systems would have greater impacts to acres of California state listed plant species and habitat affected; acres of big game migration corridors affected, and acres of potential threatened or endangered animal habitat affected, (the Yuma clapper rail, peregrine falcon, blunt-nosed leopard lizard, Tehachapi slender salamander, San Joaquin kit fox, black-footed ferret, Nelson's antelope squirrel, short-nosed kangaroo rat, and giant kangaroo rat).

Premise 2

Premise number two is simply a reflection of the fact that existing systems may be expanded incrementally as the EOR/cogen market develops. Kern River must impact the environment along the entire proposed ROW regardless of the amount of gas initially or ultimately needed for that market. The environment along the El Paso and Transwestern systems involved in the proposed expansion can be impacted incrementally if the market does not materialize instantly at the level specified in the applications. Indeed, if it never attains that level, the environmental impact may be contained at a lower level.

It is staff's further position that the Transwestern Expansion may be unnecessary since the El Paso system may be able to supply all of the design requirements of either Mojave or El Dorado with substantially fewer new facilities. The question of El Paso being able to supply the entire volume is being addressed in the FERC's hearing process.

For the WyCal proposal, the Transwestern Expansion is not necessary or proposed. The facilities associated with El Paso's Base Case may or may not be necessary, and the environment along this El Paso system can be impacted incrementally if the market does not materialize instantly at the level specified in the applications. This same philosophy would apply for the Transwestern Supply Lateral (i.e., the Mojave Transfer Line) associated with the WyCal Proposal. Carrying this philosophy further, the segment of the proposed WyCal route from Hams Fork, Wyoming, to Piute Junction, California, would not necessarily be required if the market does not materialize. Therefore, given our concern about the potential length of WyCal's proposal and associated environmental impact, the staff concludes that the WyCal route should be incrementally built only as the market materializes. It is recommended that the WyCal system be built in the following sequential manner:

1. The segment of the route from Topock, Arizona, to Bakersfield, California. Consideration should be given at that time of increasing the initial section from Topock, Arizona, to Piute Junction, California, from 24-inch to 36-inch O.D. pipeline. In essence, a pipeline system similar to Mojave's should be built first.

2. The Transwestern Supply Laterals should be built second, dependent on market conditions.

3. The segment from Hams Fork, Wyoming, to Piute Junction, California. Staff again recommends the use of the Wasatch Variation in Utah and the North Las Vegas Variation in Nevada (with its 41-mile extension to reconnect with WyCal's proposed route).

As presented in the analyses of the intrastate systems in Section 2, the Northwest/PGT/Integrated Intrastate System Alternative would cause no environmental impacts. Based on purely environmental grounds this intrastate system alternative would be far superior to any of the interstate systems discussed above. The Integrated Intrastate System Alternative is also vastly preferable to the other systems since it includes only minimal facilities. However, it is not known at this point if the intrastate system alternatives could meet one of the main goals of the project i.e., providing a firm supply of gas to the EOR market. Again, this is beyond the scope of the EIR/EIS but will be given full consideration in the later phases of the FERC certification process.

If the certification process determines that an intrastate system could meet the stated goals of the project, the Northwest/PGT/Integrated Intrastate System Alternative or the Integrated Intrastate System Alternative would be the environmentally preferred system.

To adequately protect the environment, all of the mitigation measures outlined here in Volume III (which is a condensed version of Sections 4 of both Volumes I and II of the FEIR/S) have been recommended for incorporation into the FERC certificate. These measures have been divided into two categories: general measures which would be applicable to all of the projects, and measures designed to address the specific problems associated with individual systems. In several instances the staff recommended measures which have already been proposed by certain applicants and/or reworded by staff. The staff also recognizes that a limited number of the general measures may not apply to all the applicants. It is staff's opinion that these measures will also apply to the gas gathering and delivery facilities discussed in the Introduction of Volume VI, as well as access roads and other ancillary facilities. To the extent this may have been unclear before, a new Mitigation Measure No. 156 resolves such concerns.

Staff also recognizes that during the course of the on-going FERC hearings, which commenced September 9, 1987, that Kern River, WyCal, and Mojave have testified that they are willing to make and/or have made route modifications to their respective proposed routes in order to eliminate most of the land use and recreation impacts addressed in the FEIR/S. Most of these route modifications were previously recommended in the Draft EIR/EIS. For example, Kern River has testified that they would accept a FERC certificate which would require them to use the Wasatch and North Las Vegas Variations. This would eliminate the land use and recreational conflicts associated with the Uinta National Forest, Sunrise Mountain Natural Area, Rainbow Gardens, Las Vegas Wash, and the city of Henderson. Mojave has testified that they have already made specific route modifications which would eliminate impacts to Tehachapi Mountain Park, Kern River County Park, and the residential areas of Stallion Springs and Indian John Spring. The modifications would also put the proposed route back in BLM utility corridors from which it deviated and also place the route outside of property owned by Edwards Air Force Base thereby eliminating this land use conflict. WyCal has also agreed to these modifications as a condition for obtaining a certificate. Although commitments have been made by each applicant, staff has retained its previous recommendations to avoid the land use and recreational impacts in the FEIR/S and have not included these changes in impacts for any of the proposals. There is also one route modification near the beginning of the Kern Lateral which is outside the one-mile corridor studied in the FEIR/S. This route modification is less than 1-1/2 miles long and is less than 1/2 mile outside the studied corridors. With the possible exception of impacts to biological and cultural resources, the impacts are expected to be minor. With respect to biological and cultural resources, staff's mitigation measures, which require further studies for these resources, should mitigate impacts to these resources.

3.1 GENERAL STAFF RECOMMENDED MITIGATION MEASURES

With the exception of Mitigation Measures Nos. 144 and 152 which call for the utilization of the Wasatch and North Las Vegas Variations, WyCal has adopted all of the other measures as part of its proposed action. This includes Measure Nos. 112-117 which were specific to the Mojave proposal and Measure Nos. 143, 145-151, 153, and 154 which were specific to the Kern River Proposal.

Mitigation Measure No. 98 has been revised to include existing debris basins. One additional measure is recommended specifically for Wycal (No. 155) and one additional measures (No. 156) is recommended for all of the applicants.

3.1.1 Air Quality

General Impact: High dust levels would be present during construction.

1. The ROW shall be watered to keep dust down to a manageable level.

General Impact: Construction vehicle emissions would exceed stationary source levels.

2. Construction emissions shall be mitigated through proper maintenance of construction equipment, and by maintaining manufacturer-installed exhaust systems for construction emissions.

General Impact: High vehicle emissions would be present during construction.

3. Impacts shall be reduced by optimizing air-to-fuel ratios and retarded ignition timing on construction vehicles.

3.1.2 Geology

General Impact: Geologic and seismologic hazards may result in damage to the pipeline and related facilities, and significant indirect effects.

4. Detailed geologic, seismologic, and geotechnical studies shall be conducted by the applicant to identify and characterize geologic hazards as appropriate. In areas where hazards are identified, information shall be collected to aid in the design and construction of the pipeline and ancillary facilities. In general, care shall be taken during construction to minimize surface disturbance and related soil erosion, and not to alter the drainage of the affected area.

5. Additional studies shall be conducted by the applicant to evaluate potential seismological hazards along the proposed routes. The potential for surface offset along Quaternary faults shall be evaluated in detail so that appropriate pipeline crossings can be designed. Field studies shall be completed to delineate the areas where movements may occur.

General Impact: Hydrocompaction and subsidence may occur along portions of the route.

6. The construction of the proposed projects would probably not introduce water that might cause hydrocompaction; however, care shall be taken during construction so as not to disturb the drainage of the affected area and to avoid producing any depressions in which water could pond.

General Impact: Unstable slopes may result in landslides which could result in a pipeline rupture.

7. Field studies shall be completed to locate and characterize potentially unstable slopes and other surficial features. Monitoring and surveillance programs shall be implemented, if necessary. Known landslide areas where new construction could jeopardize prior existing rights should be avoided.

General Impact: Pipeline construction in geologically hazardous areas can significantly affect public safety.

8. Results of the proposed applicants' geotechnical studies indicated in Nos. 4, 5, and 7 above shall be submitted to the FERC. The following geotechnical studies and mitigating design measures shall be submitted for review and approval by the FERC staff prior to implementation of these measures. Such studies shall include identification of: (a) all Holocene faults crossed by the proposed facilities; (b) all areas where potentially liquefiable deposits are crossed and likely effects on the facilities; and (c) all landslides or areas of significant slope instability crossed by, or possibly affecting, the proposed facilities.

   Specific mitigating measures shall be developed to minimize the potential for slope failures, ruptures or failure of pipeline facilities wherever such failure could result in direct or indirect hazards to public safety and environmental resources. The nature and locations of significant geologic hazards shall be considered in the siting of block valves. The applicant shall also consider use of automatic or remote-controlled block valves in areas which may be inaccessible following a major earthquake or landslide.

   Studies shall be done in sufficient detail to allow characterization of the particular geologic hazard using state-of-the-art techniques. Sufficient justification should be included for not implementing specific mitigating measures in areas identified as subject to significant geologic hazards.

9. Accepted industry construction standards would be used to mitigated potential damage due to geological factors.

10. The topography of the corridor shall be restored to near its original contour.

11. Special methods including the use of padded ditch and heavy wall pipe shall be considered on a site-specific basis.

General Impact: Mass failure of vertical streambanks may result in exposure of and subsequent damage to pipeline.

12. Where necessary to protect pipeline from exposure, place riprap or other acceptable streambank erosion control structures on the outside bends of streams with high vertical banks.

3.1.3 Soil

General Impact: Loss of topsoil.

13. Selective salvage and replacement of topsoil (A horizon) shall be done for cultivated lands and those lands for which the land management agency or the landowner requests that topsoil be salvaged and replaced or on lands underlain by soils poorly suited or with unsuitable reclamation potential. Topsoil shall not be used for filling of sack breakers or for padding of the trench.

14. Materials unsuitable for backfilling or excess backfill material shall be disposed of by environmentally acceptable measures as arranged by the land management agency or landowner.

General Impact: Removal of vegetative cover or desert pavement resulting in increased erosion.

15. Preparation of surface shall be done to receive seed, including surface roughening and tilling across slopes, and seeding with native grass, adapted grass or other plant species.

16. To limit steepness or length of slopes, erosion control features, such as water bars, collection ditches, terraces, rock mulch (riprap), sand bars, or straw bales shall be used for temporary and permanent control.

17. The applicant shall minimize the amount of vegetation removed, and where it is removed leave the roots intact.

18. The applicant shall minimize the time interval between clearing, construction, and reseeding.

19. During construction of the project, on-site reclamation specialists, certified by The Soil Conservation Society of America, shall be employed by the company for each construction spread to provide direct applicable restoration procedures when special conditions are encountered, without causing construction delays and to provide liaison with the FS/BLM officials.

General Impact: Reduction in soil productivity.

20. The applicant shall add soil amendments, including fertilizer, and use appropriate seeding methods to aid in the development of a positive growth medium where deemed necessary through consultation with land management agencies or private land owners.

General Impact: Accelerated soil erosion.

21. Where practical, as determined by the appropriate regulatory agency, the pipeline shall be located on sideslopes of less than 30 percent.

22. Cultivation and land preparation operations on steeply sloping areas shall be done on the contour (if feasible) to minimize erosion.

23. Fencing of ROW through rangeland shall be done, subject to site specific analysis and/or negotiation with the landowner/land management agency, to allow undisturbed reestablishment of vegetation. In the absence of recommendations on the location of crossovers from local land managers or permittees, crossovers shall be located every 500 yards. Fencing of disturbed riparian areas in non-rangeland will be required to prevent grazing damage from big game to newly established vegetation.

24. The applicant shall minimize the areas of disturbance to a minimum necessary to construct and operate the pipeline. Steep slopes and particularly sensitive areas prone to significant impact shall be avoided where practicable.

25. Suitable mulches and other soil stabilizing practices shall be used, as required by site specific conditions, on all regraded and topsoil areas identified in consultation with jurisdictional land management agencies and land owners, to protect unvegetated soil from wind and water erosion and to improve water absorption.

26. Soil areas with rock fragments, such as very coarse gravel, cobble or stone scattered on the surface or desert pavement conditions shall be restored as nearly as possible to the original preconstruction surface condition to blend with the adjoining area, to avoid a smooth surface ROW area, and to control accelerated erosion.

General Impact: Ineffective stabilization and reclamation on federal lands.

27. On federal lands, a detailed site-specific geotechnical and restoration and reclamation plan shall be developed and become part of the Forest Service/Bureau of Land Management construction, operation, and maintenance (COM) plan. Because the proposed ROW is composed of many types of terrain, soils, water, bedrock, vegetation, land uses, and climatic conditions, the detailed plan shall include sets of techniques and measures tailored to each condition encountered. Local expertise and locally effective slope stabilization and reclamation methods shall be followed when the site-specific procedures for the detailed plans are developed. Site-specific geotechnical and erosion control, revegetation, and restoration measures from the plans shall be implemented under the direction of the appropriate agency official. Consultation with all appropriate state and federal agencies and other local experts will be required when developing detailed site-specific revegetation plans.

28. For non-federal lands, develop and implement site-specific erosion control, revegetation, and stabilization plans according to BLM, FS, SCS, and other federal and state agency guidelines or criteria.

29. All topsoil on federal lands shall be conserved for reclamation requirements unless otherwise directed by the FS/BLM; excess topsoil shall be stockpiled at designated locations. Topsoil shall be removed, windrowed separately, protected, and replaced last during backfilling.

30. During adverse weather conditions, as determined by the FS/BLM authorized officer, stop and start orders on federal lands shall be issued to prevent rutting or excessive tracking of soils and deterioration of vegetation in the ROW area.

31. On all federal lands, design and construction of all temporary, reconstructed, and newly constructed roads shall be based on an approved COM plan transportation section and shall ensure proper drainage, minimize soil erosion, and preserve topsoil. This plan shall include clearing work, rehabilitation, and use and maintenance agreements associated with transportation needs.

Where possible, the ROW itself shall be used as an access road during the construction period. The FS may require that the access roads paralleling this pipeline be closed and vegetative cover re-established after pipeline construction is completed and may not permit maintenance roads along the pipeline route.

Overland access may be specified in lieu of road construction or reconstruction.

All temporary roads shall be closed and areas restored without undue delay or maintained as specified in the ROW grant(s) or special use permit(s). Restoration to near original slope and contour, including redistribution of topsoil, would be to the satisfaction of the appropriate land management agency.

32. On federal lands, a specific trenching and excavated material stockpiling procedure shall be used on steep-sloping and rough, broken terrain to ensure minimum disturbance as outlined in the FS/BLM COM plan.

33. On federal lands, temporary work space areas used at highway and stream crossings and other special sites shall be restored to approximate pre-construction conditions and to the satisfaction of the FS/BLM.

34. To reduce compaction and improve soil permeability in rangeland areas, the ROW shall be scarified or chiseled where needed. Contour furrowing, terracing, water barring, etc., as directed by the FS/BLM or landowners, shall be done on steeper slopes to increase infiltration and to reduce runoff and erosion.

3.1.4 Surface Water

General Impact: Increased surface runoff, erosion, and off-site sedimentation associated with ROW clearing, construction, operation and abandonment of the ROW.

35. The applicant shall develop and implement site-specific erosion control, revegetation, and stabilization plans as soon as possible to limit soil erosion and potential sediment input. This plan must be acceptable to the appropriate regulatory agency. In addition to this plan, an anti-degradation analysis of water quality should be undertaken to assure that the highest statutory and regulatory requirements and best management practices for pollutant controls are achieved.

36. The applicant shall minimize stream bank and streambed disturbance to the extent practicable. Construction impact

should not exceed two weeks. Periods of low flow shall be utilized when crossing stream channels.

37. Construction across intermittent and perennial streams shall be done during periods of low or no flow where practicable. Stringent water quality control measures shall be utilized on crossings made during moderate to high flow periods.

38. After pipeline construction is completed, construction contractors shall stabilize disturbed areas promptly.

General Impact: The proposed measures for controlling or reducing impacts caused by the withdrawal and discharge of water used in hydrostatic testing would not ensure that the impacts would be reduced to acceptable, non-significant levels.

39. If required by state or Federal discharge permits, hydrostatic test water shall be tested and treated, as necessary, before release.

40. Hydrostatic test water shall be released in a controlled manner to reduce the potential for scour if discharged into natural waterways.

41. Water used in hydrostatic testing of the pipeline shall be discharged in accordance with local, state and federal (NPDES) permits. If retention ponds are stipulated, the applicant will consult with the land managing agency or landowner to determine the disposition of the pond after construction.

42. No stream with an inadequate flow rate shall be used as a water source for hydrostatic testing, and adequate flow should be maintained for instream uses and downstream withdrawals. Consultation with the appropriate agency will be required to determine adequate stream flows.

43. Water for hydrostatic testing shall be reused wherever possible.

General Impact: Reduced water quality, increased sediment loading, and aggradation and degradation of stream channels due to channel bed disruption in response to constructing pipelines through channels.

44. The pipeline shall be buried at stream crossings below the estimated scour depths associated with a 100-year flood event. Where channel degradation during operation reduces the burial depth to less than the 100-year scour depth, the applicant shall ensure the integrity of the pipeline through reburial to the proper depth wherever feasible.

Where reburial is not practicable other methods such as installation of anchors and riprapping shall be employed.

45. Pipeline operators shall check the pipeline burial depth periodically at stream/channel crossings.

46. Coffer dams shall be utilized where necessary and their specific use shall be determined based upon the analysis of specific stream crossings, detailed engineering design and consultation with the Army Corps of Engineers.

47. Stream crossings shall be made as perpendicular to the axis of the channel as possible.

48. Spoil from trench excavation shall be placed out of the stream on the banks at narrow stream crossings. Spoil shall be carefully placed downstream of the trench at wide crossings. Backfilling at streams shall be performed slowly to minimize agitation and increased sediment loading. Good quality backfill shall be placed in streams.

General Impact: Reduction in water quality due to fuel or chemical spillage, and impacts to surface water and groundwater resources during the construction and operation of the pipeline.

49. Chemicals, fuel, and lubricating oils shall not be stored near stream channels. Spill containments shall be installed or constructed around all chemical, fuel, and oil storage areas. Refueling and changing of lubricating oil shall not be done in or near stream channels, or where an accidental spill could run into a stream channel or shallow ground water zone. Any accidental spills shall be promptly cleaned up.

General Impact: Not all increased surface runoff, erosion, and off-site sedimentation would be reduced to acceptable, non-significant levels. Additional mitigation beyond the proposed would be required to further reduce these impacts.

50. Intensive surface runoff and erosion control shall be required beyond those proposed on steep slopes that would drain directly into streams. The applicant shall use sediment filters, closely spaced water bars, and erosion netting.

51. The applicant shall minimize ROW width to that absolutely necessary.

3.1.5 Groundwater

General Impact: Potential channeling of groundwater along the pipeline.

52. Bulkheads or ditch plugs shall be installedy in the trench on slopes where necessary to minimize potential channeling.

General Impact: Effects on springs.

53. The applicant shall identify all nearby springs which serve as sources of water supply or are important to wildlife, evaluate potential effects of construction, and take appropriate precautions to avoid impacts such as increased access to and use of springs by humans that could result in decreased use by wildlife.

3.1.6 Freshwater Biology

General Impact: Increased turbidity and sedimentation of aquatic habitats.

54. Where possible, the applicant shall work backhoes or draglines from the stream banks to trench any submerged stream crossings.

55. During construction on federal lands near streams or lakes, sedimentation basins and/or straw bale filters shall be constructed, as required by the FS/BLM.

General Impact: Disturbed stream banks would result in bank cutting and erosion.

56. Disturbed stream banks shall be restored by replacing topsoil and replanting native riparian species. Where appropriate and feasible, stream crossings will be fenced to ensure reclamation of riparian habitat. Fencing will be done on a site-specific basis in consultation with the appropriate state and federal land management authorities.

3.1.7 Terrestrial Biology

3.1.7.1 Vegetation

General Impact: Loss or disturbance of vegetation along the construction ROW.

57. The applicant shall design and implement site-specific revegetation plans according to the requirements and guidelines of the land management agency (BLM, USFWS, or

FS), state agency, or landowner. These plans shall include the necessary topsoil replacement, seedbed preparation, mulching, fertilization, use of seed mixtures containing native species, noxious weed control and additional erosion control. Generally the revegetation objective would be to return the disturbed area to a condition that would perpetuate previous land use. Guidelines established by the SCS shall be used where the pipeline would traverse private land, and if it is agreeable to the owner. Periodic inspection of the ROW shall be conducted by the applicant and reclamation efforts enhanced where needed.

58. During construction in sensitive areas, the applicant shall clear the minimum ROW width possible and minimize ROW damage where possible (e.g. not stripping vegetation less than four inches in height, leaving trees standing and/or mowing taller vegetation as opposed to clearing, the last being particularly desirable in Mojavean shrub communities). This shall include local adjustment of pipeline alignment to avoid areas with high densities of sensitive plant species or sensitive communities.

59. Existing ground cover such as grasses, leaves, brush, and tree trimmings shall be cleared and piled only to the extent necessary. Slash and limbs shall be piled and later shredded and chipped for use in restoration operations or disposed of as directed by the appropriate agency or landowner.

60. Trees and shrubs that are not cleared shall be protected from damage during construction.

61. Trench backfilling operations shall be conducted in such a manner to minimize further disturbance of vegetation.

62. Joint inspection of the ROW by the company(ies) and the FS/BLM shall be conducted on federal lands to monitor the success and maintenance of erosion control measures and revegetation programs on native grazing lands for two growing seasons, or for a period determined by the FS/BLM. The monitoring program would identify problem areas and corrective measures to ensure vegetation cover and erosion control. Certification of successful revegetation and erosion control would be determined by the FS/BLM.

63. On federal lands, seed shall be planted by drilling, broadcasting, or hydroseeding. Drilling is the preferred method, because it is usually most successful.

- o Drill seeding with a grass drill equipped with depth bands shall be used where topography and soil conditions allow operations of equipment to meet the seeding requirements of the species being planted.

- o Broadcast seeding shall be used for inaccessible or small areas. Seed shall be covered by raking or harrowing.

- o Hydroseeding would be done in critical areas determined by the FS/BLM.

64. Only species adapted to local soil and climatic conditions shall be used on federal lands. Generally, these would be native species. However, introduced species may be considered for specific conditions when approved by the FS/BLM. Specific seeding rates shall be developed on an area-specific basis in consultation with reclamation specialists and jurisdictional agencies.

65. Testing of seed to be used on federal land will be conducted to meet state, federal, and agency seed requirements.

66. On federal lands, seeding shall be done when seasonal or weather conditions are most favorable and as determined by the FS/BLM.

67. Grazing on federal lands shall be delayed for a period directed by the FS/BLM to allow vegetation to become established, especially in highly erodible areas. Procedures for excluding grazing within the ROW should be subject to site specific analysis and/or negotiation with the land owner/land management agency and could involve protective fencing; removal of range animals from affected allotments, with compensation by the company(ies) to range permittees; adjustable grazing use schedules within allotments; etc. In the case of protective fencing, fences shall be constructed, maintained and removed by the company(s) according to FS/BLM specifications.

68. On federal land, the applicant shall preclear those areas containing merchantable timber prior to dozer or maintenance blade work. Preclearing would involve handwork or specialized equipment, i.e. mechanized shears, etc., in cutting of brush or trees with removal by proper equipment to designated areas. The applicant shall windrow all scalped and remaining large woody vegetation along the edge of the ROW.

General Impact: Loss of sensitive plant species individuals or habitat.

69. The applicant shall avoid, where feasible and necessary, locations of sensitive species and environmentally sensitive areas which include sensitive communities and known and suspected habitat of plant species of special concern. Specific information on sensitive areas shall be

obtained by conducting field surveys along portions of the proposed route for individuals and habitat of species of concern and sensitive communities. Field surveys shall be conducted during the appropriate time of year by a qualified botanist. Where feasible, pipeline alignment shall be adjusted to miss or minimize impacts to identified individuals or habitats.

70. For areas supporting sensitive plant communities or plant species of special concern, the applicant shall restrict access onto the pipeline ROW where possible, by constructing barricades, fences with locked gates or by posting with signs.

71. Wetland and riparian vegetation impacted by construction or operation shall be replaced in kind.

72. Removal of certain sensitive plant species from the ROW may be a way to decrease impacts to certain plant species in California. If plants are removed, replanting shall occur in suitable habitat outside the zone of potential disturbance (construction and ORV use). Such sites shall be established in consultation with the appropriate land management agencies.

General Impact: The loss of plant species of special concern or species contained in sensitive communities due to pipeline construction when it is not feasible to avoid such areas containing these species.

73. The applicant shall conduct detailed surveys as directed by the appropriate governmental agencies to identify precise locations of species of special concern or species contained in sensitive communities. The applicant shall utilize survey results to avoid or alleviate impacts that would likely result in the loss of these species.

74. When it is not feasible to avoid areas containing plant species of special concern, the applicant shall attempt to transplant such perennial plant species back into the ROW after construction.

3.1.7.2 Wildlife

General Impact: Disturbance to any species of special concern and high interest species, such as big game animals and raptors during periods of high stress (i.e. times of migration, and breeding and/or rearing).

75. The applicant shall conduct a preliminary survey using a competent wildlife biologist to identify any raptor nests within the area of concern. All raptor nests found within

the ROW shall be avoided. Construction activities shall be scheduled so that they do not conflict with raptors nesting within 0.5 mile of the proposed alignment. The appropriate state or federal agency has guidelines defining calendar dates when activity should not occur for these species.

76. Impacts to high interest species could be sufficiently mitigated through scheduling construction activities so that they do not conflict with resident wildlife during times of high stress. The appropriate state or federal management agency has guidelines defining calendar dates when activity should not occur for the species in question. scheduling for construction may vary with the environment and climatological circumstances for any given year.

77. The applicant shall prohibit vehicle operation off the ROW by construction workers, including construction work and employee access, except where specified by the landowner or land management agency or where roads already exist.

78. Limit speed of vehicles along the ROW and access roads to 15 mph in sensitive habitats that support species of special concern with limited home ranges and mobility, e.g., the blunt-nosed leopard lizard and the desert tortoise. Construction and maintenance employees shall also be advised that care should be exercised when commuting to and from the project area to reduce road mortality.

79. Project related powerlines shall be designed to protect birds from electrocution and collision.

General Impact: Disturbance or loss of habitat necessary to sustain high interest wildlife species. This includes but is not limited to habitat utilized as courtship, nesting/rearing areas, and special habitat features such as water guzzlers, water tanks and springs.

80. The applicant shall revegetate all disturbed wildlife habitat deemed important to high interest species to predisturbance levels, following guidelines formulated by the appropriate governmental agencies.

General Impact: Loss of individuals of any species of special concern (federal and/or state listed or candidate species, BLM sensitive species). Disturbance that results in a reduction in recruitment to their populations.

81. The following 12 conservation measures were recommended by the U.S. Fish and Wildlife Service in their biological opinion on these projects. The 12 conservation measures apply only to those projects traversing the San Joaquin

Valley in California. As part of the formal consultation process between USFWS and FERC, the staff adopts these measures.

a) The pipeline alignment through the southern San Joaquin Valley shall be modified to reduce impacts to extant wildland habitats utilized by the San Joaquin kit fox, blunt-nosed leopard lizard, and giant kangaroo rat. Modification shall include maximizing pipeline siting and associated access routes, staging/laydown sites, structures, and other related facilities on currently intensively developed agricultural lands or other highly modified areas. The applicant(s) shall provide a supplemental biological assessment based on route re-alignment and field surveys to the U.S. Fish and Wildlife Service and Federal Energy Regulatory Commission for review and comment prior to construction. The subject report should clearly state the following: (a) alignment of the modified pipeline route; (b) survey methodologies and results, with detailed estimates of numbers of animals and sign observed and acreage of extant habitats of each species that will still be unavoidable impacts; (c) mitigation measures mandated for species/habitat protection; and (d) measures mandated for offsetting unmitigable on-site affects to these species. The specific route realignment and associated mitigation must be acceptable to the U.S. Fish and Wildlife Service and the Federal Energy Regulatory Commission staff. Concurrence from the U.S. Fish and Wildlife Service shall precede any construction within the geographic range of the San Joaquin kit fox, blunt-nosed leopard lizard, and giant kangaroo rat.

b) The pipeline alignment shall avoid, to the extent practical, habitats of the San Joaquin kit fox, blunt-nosed leopard lizard, and giant kangaroo rat.

c) Construction activities must be confined to a maximum 100-foot-wide corridor within habitat of the San Joaquin kit fox, blunt-nosed leopard lizard, or giant kangaroo rat. Where corridors in excess of this 100-foot-width may be disturbed, the applicant shall obtain concurrent from the U.S. Fish and Wildlife Service prior to initiation of construction.

   Prior to construction, the applicant shall submit the following information to the U.S. Fish and Wildlife Service for review and comment:

   - proposed locations of all access roads, staging/ laydown areas, pumping stations, valve stations, and other ancillary facilities that are planned within extant habitats of the San Joaquin kit fox, blunt-nosed leopard lizard, and giant kangaroo rat;

- o results of preliminary surveys of these sites for the occurrence of listed species and their sign;
- o estimates of acreage of listed species habitats that will be adversely affected by proposed project actions; and
- o measures proposed to limit habitat disturbance and harm to listed species.

d) Construction shall take place in a manner that employs the following actions to reduce incidental take to listed species:

- o A biologist familiar with the habits of these species and their sign shall be present on-site during construction.
- o Construction shall utilize the minimum numbers and types of vehicles and equipment necessary on portions of the proposed alignment within listed species habitat.
- o Stockpiling of equipment and parking of vehicles shall be undertaken to the maximum extent possible on previously disturbed areas proximate to the construction zone.
- o Locations of San Joaquin kit fox dens and giant kangaroo rat burrow systems shall be prominently staked and flagged to decrease inadvertent destruction.

e) Maintenance activities within the project pipeline right-of-way that require the cross-country driving of vehicles or equipment or the removal of vegetation shall be limited to those actions required to effect repairs or for "emergency" situations where environmental or public health is placed at risk. Regular crushing or mowing of vegetation within the pipeline corridor crossing habitats utilized by the San Joaquin kit fox, blunt-nosed leopard lizard, or giant kangaroo rat is not authorized. Regular vehicle access along the proposed pipeline corridor within listed species habitats shall be limited to existing roads or to newly constructed access roads approved with the prior review and concurrence of the U.S. Fish and Wildlife Service.

f) Preconstruction surveys shall be required for all project-related construction activities that have the potential to result in the incidental taking of San Joaquin kit foxes and blunt-nosed leopard lizards. Planned locations of associated roads, staging/laydown sites, valve stations, pumping stations, and other related facilities within potentially occupiable habitats of one or more of these species must also be surveyed. Such surveys must be conducted within 60 days from the planned start of construction. Locations of kit fox dens and giant kangaroo rat burrow systems shall be prominently marked and mapped during these surveys. Proposed project construction activities shall be modified to the extent possible to avoid destruction of all kit fox dens and giant kangaroo rat burrows identified. The proposed pipeline construction corridor must be adjusted to maintain a minimum 50-foot construction-free "buffer" from any San Joaquin kit fox dens or giant kangaroo rat burrows. Flagging and stakes identifying the locations of these sites shall be removed within 60 days of termination of construction activities.

g) In the event that a San Joaquin kit fox den or giant kangaroo rat burrow will be unavoidably destroyed by a planned project action, the following procedures shall be followed:

- Prior to construction, the entrance(s) of the kit fox den or giant kangaroo rat burrow system shall be partially blocked with loose dirt for several days to discourage use while allowing any animals in residence to escape.

- The partially blocked kit fox den or giant kangaroo rat burrow system shall then be excavated using hand tools either by a wildlife biologist or under the direct supervision of a wildlife biologist to ensure that no animals are trapped or injured. Animals discovered will be allowed to escape.

- Excavated San Joaquin kit fox dens and giant kangaroo rat burrows shall be completely destroyed to prevent later use prior to on-set of construction.

- Documentation of the San Joaquin kit fox den or giant kangaroo rat burrow loss shall be conveyed in writing to the U.S. Fish and Wildlife Service within five days of the date of den or burrow destruction.

- If the subject den is a natal or pupping den, the applicant, prior to destruction of this den site, shall contact the U.S. Fish and Wildlife Service.

- Where San Joaquin kit fox dens are destroyed from project-related actions, the applicant shall construct an equal number of artificial dens to partially offset lost predator-avoidance habitat. Selection of artificial den sites location and design shall be made by field biologists hired by the applicant in discussion with the U.S. Fish and Wildlife Service and California Department of Fish and Game staff.

h) The applicant shall develop and implement a worker education program that addresses:

   - the occurrence and distribution of the San Joaquin kit fox, blunt-nosed leopard lizard and giant kangaroo rat within the project area;
   - measures being implemented to protect these species during project construction and subsequent maintenance activities; and
   - methods that individual employees can undertake to facilitate this process.

i) Any application of rodenticides within the geographic range of the San Joaquin kit fox and giant kangaroo rat for subsequent facility or road embankment maintenance to control California ground squirrels (Sphermophilus beecheyi) shall be limited to spot-treatment with zinc phosphide. NO rodenticides may be applied within a one-quarter-mile radius of known giant kangaroo rat burrow systems.

j) In the event of a pipeline rupture, the following measures shall be used to reduce incidental taking of the San Joaquin kit fox, blunt-nosed leopard lizard, and giant kangaroo rat:

   - The California Department of Fish and Game and U.S. Fish and Wildlife Service shall be immediately notified of any pipeline rupture, its specific location and extent, and measures underway for cleanup and pipeline repair.
   - Cleanup and restoration of the area affected by the pipeline rupture shall include:
     - immediate containment, using constructed earthen berms or other means to contain the damage to the smallest possible area;
     - utilizing biologists familiar with these species to locate and flag San Joaquin kit fox dens, giant kangaroo rat burrows or other especially sensitive areas for avoidance by cleanup equipment, and to inventory the impacted area for entrapped or injured wildlife, effecting rescue where possible;
     - removal of contaminants and contaminated soils for safe off-site disposal in an expeditious fashion; and
     - recontouring and restoring the affected area, including utilizing vegetation restoration techniques, until equal to pre-impact condition.

k) If the established limit of incidental take of any federally-listed species is exceeded, the causative action shall cease and consultation shall be reinitiated within five working days of the most recent mortality.

l) The U.S. Fish and Wildlife Service is to be notified within three working days of the finding of any endangered species found dead during this project. Any San Joaquin kit foxes, blunt-nosed leopard lizards, or giant kangaroo rats found dead or injured shall be turned in to the California Department of Fish and Game.

82. The applicant shall conduct detailed surveys prior to construction as directed by the appropriate governmental agencies in order to identify precise locations of viable populations. Surveys shall be conducted at the appropriate season and time to ensure that targeted species can be enumerated. The applicant shall utilize survey results to avoid or alleviate impacts that would likely result in the loss of individuals of species of special concern.

83. In San Joaquin kit fox habitat, establish temporary artificial barriers 35-50 feet from washes to minimize potential chemical contamination from surface runoff.

84. Construction activities for threatened or endangered species shall be timed so as not to conflict with crucial time periods such as hibernation. This would apply to the blunt-nosed leopard lizard but not to the desert tortoise where construction during hibernation is desired.

85. In areas potentially occupied by desert tortoise, the following mitigation methodology modified from Reyes-French [1985] shall be adopted. Conduct preconstruction surveys to delineate areas of construction activities. Within potential desert tortoise habitat, construction procedures shall be restricted to tortoise hibernation periods. This construction window would be 1 October to 1 April in the eastern Mojave Desert of California, Nevada and Utah; 15 October to 1 March in the western Mojave Desert of California; and 30 October to 1 March in Arizona. A competent tortoise biologist will survey the route and other areas of potential disturbance immediately in advance of construction and remove active and/or hibernating tortoises to a site outside the ROW. A competent biologist will return the tortoises to capture points after surface disturbances have been completed. A competent tortoise biologist will also be on-site during any flushing or hydrostatic testing to prevent loss or injure to individuals. Injured or dead tortoises will be handled and/or disposed according to Memorandum of Understanding with state fish and game agencies and the U.S. Fish and Wildlife Service. Any Arizona tortoises found injured or dead shall be surrendered to the Arizona Game and Fish

Department. Barriers and signs will be placed along the ROW to inhibit use of the ROW as an off-road vehicle road or trail. All construction vehicles and equipment will be restricted to the ROW to limit tortoise habitat degradation. Construction personnel will be informed of the sensitive nature of this species and the prohibitions against vandalism and removal of individuals. These measures would not be required of Northwest since no desert tortoise habitat would be present.

86. The length and duration of open trenches shall be kept to the minimum extent feasible. Limiting the length and duration of open trenches in areas of sensitive species shall be developed on a site-specific/species-specific basis. The amount of open ditch and duration of open ditch in areas of sensitive species shall be governed by cooperation of applicants and appropriate land management/wildlife agencies. Before backfilling, the trench shall be inspected for trapped animals. All such animals shall then be released in the same general locality, but beyond the area of disturbance.

87. Trenches shall be inspected daily for species of special concern that might have fallen into the trenches. Any species of special concern found should be handled in accordance with prearranged agreements with the appropriate agencies.

88. Access to the ROW shall be restricted wherever feasible by constructing barricades, fences with locked gates at road intersections, and by posting signs. State wildlife agencies, as well as federal agencies, shall be consulted to help identify and establish wildlife management areas. Vehicle access (except for administrative purposes) to these areas shall be restricted. On federal land, as directed by the Forest Service/BLM, temporary and/or permanent structures shall be installed at specific locations along the ROW and other disturbed sites to prevent off-road vehicle access.

General Impact: Loss or disturbance of habitat utilized by species of special concern. This includes any designated critical habitat of proposed or listed threatened or endangered species, or loss or disturbance of greater than one percent of habitat supporting a viable population of species of special concern.

89. The applicant shall conduct field surveys as directed by the appropriate governmental agencies to identify habitat that supports viable populations of species of special concern. The applicant shall avoid these areas where possible.

90. All disturbed designated critical habitat and habitat suitable for species of special concern shall be revegetated to predisturbance levels following guidelines formulated in consultation with the appropriate governmental agencies.

91. Public access into habitat of species of special concern shall be controlled by restricting access onto pipeline ROW's where possible by constructing barricades, fences with locked gates, or by posting with signs. This will be required for all wildlife management areas identified and/or established by both state and federal wildlife agencies.

3.1.7.3 Grazing

General Impact: Broken fences and disruption of natural and artificial barriers to livestock needed to maintain separation and control of livestock.

92. The applicant shall repair fences and maintain livestock separation and control devices such as cattleguards, gates, drift fences and natural barriers to equal the effectiveness of the existing control structures prior to pipeline construction or operation.

93. The applicant shall replace any water lines or drinkers damaged as a result of pipeline construction.

3.1.8 Socioeconomics

General Impact: The presence of construction workers may impact tourism and the availability of temporary housing.

94. Construction of the pipeline shall be scheduled to avoid peak tourist seasons in the affected area if possible.

95. In rural areas, workers should consider housing and services in larger, more distant communities. Project employees may be able to travel to and from construction areas together.

96. To further mitigate housing impacts in rural areas or in crowded tourist areas, workers should try to reside in temporary trailer camps.

97. The applicant shall comply with all applicable federal and state laws and regulations concerning the use of pesticides (i.e., insecticides, herbicides, fungicides, rodenticides, and other similar substances) in all activities and operations. The applicant would obtain approval from the applicable agency prior to the use of such substances. The plan would provide the type and quantity of the material to

be used; the pest, insect, fungus, etc., to be controlled; the methods of application; the location of storage and disposal of containers; and other information that the agency may require. The plan would be submitted no later than December 1 of any calendar year that covers the proposed activities for the next fiscal year (i.e., December 1, 1986, deadline for a fiscal year 1988 action). If the need for emergency use of pesticides is identified, the use must be approved. The use of substances on or near the ROW and temporary permit areas shall be in accordance with the approved plan. A pesticide would not be used if the Secretaries of the Interior and Agriculture have prohibited its use. A pesticide would be used only in accordance with its registered uses and with the Secretarial limitations. Pesticides shall not be permanently stored on federal lands.

98. All structures such as debris basins, terraces, levees, underground drainage systems, irrigation pipelines, and canals shall be restored to preconstruction conditions so that they would function as originally intended.

99. Gates on established roads on National Forest System lands shall not be locked or closed by the applicant.

100. Permittees and other regular users of National Forests affected by construction of the project(s) shall be notified in advance of any construction activity that might affect their businesses or operations. This would include but not be limited to temporary road closures, removal and/or cutting of fences, disturbances to range improvements or other range use-related structures.

101. Garbage, toxic substances and other refuse shall be disposed of in an authorized disposal site or landfill.

3.1.9 Land Use

General Impact: Conflict with land use.

102. Technical assistance and approval of written plans for National Forest System lands shall be obtained from the Forest Service prior to any construction.

103. All existing improvements under federal management or permit shall be protected and damage repaired immediately.

104. Forest Service approval shall be required for locating sites for equipment storage, pipe storage, and staging areas on National Forest System lands. A site preparation plan would be required for these sites, as part of the COM plan.

105. A fire control plan shall be prepared as part of the COM plan for the Forest Service.

3.1.10 Cultural Resources

3.1.10.1 Archaeology

General Impact: Disturbance to cultural resources could occur along the proposed routes.

106. Based on the Cultural Resource Technical Report, the regulations at 36 CFR Parts 61.2, and the new ACHP regulations at 800.4 (a) (ii) and 800.4 (b) published in the Federal Register on September 2, 1986 (51 FR 31115), the applicant(s) receiving FERC certification shall contact the appropriate SHPO(s) for assistance in evaluating additional information resources which should be consulted and their recommendations for further surveys to enable the certificated applicant(s) to form their opinion as to the eligibility of those properties currently identified in the Technical Report and identify any additional eligible or National Register properties. The certificated applicant(s) shall consult these resources and furnish the results of the assessment along with the SHPO's recommendations for field surveys to the FERC staff. The FERC, the SHPO(s), and other appropriate agencies will consult to determine the adequacy of all previous field surveys which cover portions of the certificated pipeline route and sites of appurtenant facilities, and may require further surveys on inadequately inventoried lands.

A cultural resource management plan shall then be designed by the applicant in consultation with the FERC, the SHPO(s), and other appropriate agencies including, on federal lands, BLM, the Forest Service, Bureau of Indian Affairs, and the Fish and Wildlife Service, as necessary. The management plan would outline procedures and methods to identify, evaluate, and protect (i.e., through avoidance or scientific data recovery) National Register and eligible properties. Appropriate research questions shall be included in the plan, although others may develop as the field investigation studies proceed. Guidelines for mitigation of impacts to resources that are not avoidable shall be included in the cultural resource management plan.

Consideration shall be given to a monitoring program for ground-disturbing activities in areas where cultural resource inventory indicates a likelihood that resources not now evident on the ground surface are likely to occur as buried resources. Such an "emergency discovery" program shall be consistent with the ACHP regulations at 36 CFR Parts 800.5 and 800.11 (a).

Prior to project construction, but after the formulation of the management plan, the applicant shall design and conduct an intensive cultural resource survey of the final pipeline route and ancillary facilities, where necessary, that is equivalent to a BLM Class III pedestrian survey. This survey shall be done in consultation with appropriate Native American groups to help identify resources of traditional Native American value.

Upon completion of the field surveys, the applicant shall identify for the FERC and appropriate SHPO(s) all cultural properties potentially affected by the undertaking, and how each property addresses either the research questions in the management plan, or other National Register criteria of eligibility, and the applicant's opinion of the effect of the project on any properties. Once properties are properly identified and recorded, the FERC staff, in consultation with the SHPO(s), shall identify National Register properties by applying the National Register criteria of eligibility in light of the research questions developed for the management plan, new research questions inherent in the data, or other criteria under 36 CFR 60.4. Additional information concerning the resources shall be obtained by the applicant if required by the FERC staff to apply those criteria.

Cultural resources determined eligible for inclusion in the National Register by the FERC or other authorizing agencies would then be evaluated as to the impacts of the project. A determination of effect shall be made by the FERC staff in consultation with the appropriate SHPO(s) pursuant to 36 CFR Part 800.5. Indicators for determining the potential effect of construction on cultural resources are set forth in the ACHP regulations at 36 CFR Part 800.9.

If it is determined that effects upon National Register or eligible properties would occur as a result of the project, a mitigation plan to reduce or eliminate these effects shall then be formulated. Site-specific mitigation plans shall be formulated in accordance with the appropriate provisions of the management plan. Any modification of the management plan deemed necessary in light of discoveries made during the field surveys shall also be identified. The mitigation plans shall discuss the timetables for completion of the final report for the phases of mitigation associated with data recovery, laboratory analyses and artifact curation. The final report shall document the method, theory, and results of implementing the mitigation plans. The final report shall be submitted to the FERC and the appropriate SHPO(s) upon completion in accordance with the identified timetables.

If properties on or eligible for the National Register would be affected, the FERC shall afford the ACHP an opportunity to comment on the effects of the project and the proposed mitigation plans.

Until the FERC staff has informed the applicant(s) in writing that the ACHP has provided the FERC with its comments pursuant to Section 106 of the National Historic Preservation Act and the applicant(s) has agreed to any modifications of the mitigation plan which the ACHP and the FERC staff have agreed upon, the applicant(s) may not proceed with implementation of the mitigation plans or with construction.

3.1.10.2 American Indian Concerns

107. Tribal plans for cultural resource preservation shall be followed on tribal lands. In general, sacred and archaeological sites shall be avoided whenever possible, burials shall be left undisturbed, and care shall be taken to avoid the destruction of traditionally used plants and animals. Artifacts recovered from archaeological excavation shall be returned to the tribe if found on tribal lands.

3.1.11 Paleontological Resources

General Impact: Loss or disturbance of paleontological resources could occur along the pipeline route.

108. The applicant shall implement the following measures to avoid or mitigate potentially adverse effects to paleontological resources resulting from construction of the proposed project that shall be implemented by the applicant in consultation with the appropriate resource management agencies. Implementation of this program should reduce damage to, or destruction of, significant fossils as a result of bedrock disturbances during construction operations. This program shall include pre-construction measures and monitoring of sensitive areas during construction operations.

Pre-Construction. After consultation with the appropriate resource management agency, those areas identified as being of high paleontological sensitivity shall be examined prior to construction to determine the precise nature and location of fossils previously discovered within one mile of the pipeline route. Attention shall be directed toward identifying sections of these corridors where construction would result in bedrock disturbance adjacent to localities known to yield significant fossils. An initial pre-construction evaluation shall be made by comprehensively reviewing pertinent published paleontological literature, museum fossil locality records, and by requesting additional locality data from paleontologists who are engaged in active research in these areas.

A pre-construction surficial field inventory may then be recommended for those parts of the 100-foot wide pipeline construction right-of-way where disturbance of fossils may occur. The purpose of this inventory would be to evaluate in more detail the significance of local fossils by identifying the fossil types present, ascertaining their quality of preservation, and determining more precisely their extent and distribution. At some localities, small shallow trenches may be excavated to facilitate these observations.

If it is found that significant fossils could be adversely affected, appropriate site-specific mitigation measures shall be designed. These measures may include the controlled scientific removal of fossils that would otherwise be damaged or destroyed during construction. Any such removals shall be made by professional paleontologists authorized by the appropriate federal, state, and county collecting permits. In accordance with these permits, all fossils shall be placed in appropriate repositories, with records of their precise locality, and descriptions of the geological and faunal context of each. This survey shall also determine whether additional mitigation measures should be implemented during construction activities.

Construction. Mitigation measures that may be implemented during construction shall include monitoring construction activities in which bedrock would be disturbed. This may entail inspection of cleared and graded sections of the corridor before trenching, and inspection of the rock excavated from the trench.

Procedures shall be established and approved by permitting agencies for temporarily halting or redirecting construction if fossil accumulations are encountered during construction. An approved paleontologist, contracted to implement the management plan, shall be notified immediately upon encountering a chance fossil find so that the significance of the find can be evaluated efficiently and, if necessary, mitigation actions taken.

If significant fossils are encountered during construction, their controlled scientific removal from the construction site may be necessary. Removal of fossils discovered during construction shall be implemented by professional paleontologists in accordance with professionally recognized standards.

3.1.12 Visual Resources

General Impact: Degradation of visual resources could occur along the pipeline route.

109. The applicant shall implement three generic types of mitigation techniques: 1) strategic location, 2) minimization of disturbance, and 3) repetition of basic landscape elements (form, line, color, texture). Mitigation recommendations described below, based on these techniques, will reduce visual contrasts of the project facilities.

Construction. During construction, clearing of land for facilities or structures should create curvilinear boundaries instead of straight lines and minimize marring and scarring of the landscape to the greatest practical extent. Grading shall be done in a manner which will minimize erosion and conform to the natural topography [USFS, 1977].

Cleared brush or small trees not otherwise disposed of shall be piled in a way that provides cover habitat for small mammals, reptiles, and birds. Such brush piles shall be screened from public view to the greatest practical extent [Robinette, 1973].

Soil and rocks that are excavated during construction and not used shall be evenly backfilled into the cleared area or removed from the site. Soil and rocks shall be graded to conform with the terrain and the adjacent land.

Compressor Stations: The colors selected for the compressor stations, and other structures and facilities shall be based on the following considerations [Robinette, 1973]:

- o The colors shall be uniform and noncontrasting to blend with the immediate natural environment. The warmest color tones are appropriate for natural settings.
- o Exposed concrete shall be tinted to match the soil color.
- o Colors shall be selected on the basis of their ability to blend with both the sky and the environment in which they are being used.
- o Colors that reflect adjacent colors by including them are most successful in adapting to their environment and shall be utilized.
- o Colors approved in the Munsell Soil Color Coding System and displayed on the Standard Environmental Color Chart shall be considered.

- o The applicant prepare a plan to minimize visual impacts from structures. If required, the applicant would prepare photographic simulations of areas in which facilities are proposed within foreground-middleground areas of high scenic value or sensitivity. Using the simulation as a guide, the applicant would design and locate the pipeline route and ancillary structures to blend into the existing environment. On federal lands, the BLM/FS would evaluate and approve measures before construction begins.

Overhead Electrical Powerline to Compressor Stations:

- o Towers or poles shall be placed strategically to make maximum use of existing topography and vegetation for screening.

- o Electrical powerlines shall be located at the base of slopes when feasible to provide a background of topography and/or natural cover.

- o Materials used to construct towers or poles shall harmonize with the natural surroundings. Where natural wood poles are appropriate, the color range should be limited to present unified series of poles.

- o Choice of conductor material shall be carefully considered to avoid sheen or a strong silhouette and to provide blending of the conductors into any given setting through which the line must pass.

- o When lines are adjacent to roads, guyed towers shall be avoided whenever possible.

Landscape-type Measure

Grading and earthwork:

- o Minimize routing pipeline along prominent ridgelines.

Forested Areas. Several different types of forest ecosystems are encountered at the higher elevations along the various loops and although they have differing species, they can be treated uniformly and the mitigation measures are virtually identical.

- o Leave trees as close to the downhill side of the ROW as possible,

- o Create as few landings and turnouts as possible, and do not locate them on the noses of ridges or exposed slopes, o Avoid grade changes as much as possible,

Distance Zone Measures

Foreground View. A foreground view is determined to be the detailed view from between 0 to 1/4-1/2 mile from the viewer. Visual impact appearing in a foreground view shall be obscured, concealed, or disguised through screening or controlling access to views.

Middleground and Background View. Views beyond 1/2 mile shall be mitigated by revegetation techniques to blend the impact back into the surrounding environment, utilizing landscape texture, color, and pattern to subordinate the impact and soften the edges.

Performance Measures

In order to meet BLM VRM and FS VQO goals, certain time limitations shall be established within which mitigation measures must occur to reduce visual impacts upon the existing environment.

110. The COM plan shall include an identification of segments of the pipeline ROW on federal lands where vegetative clearing widths would be modified, i.e., feathered or undulated. This would be done to maintain the visual quality objectives of the respective National Forest Land and Resource Management Plan.

3.1.13 Staff Recommended Mitigation Measures for the Mojave Proposal

Geology

General Impact: Volcanic activity may cause damage to the pipeline.

111. The volcanic cinder cones near Amboy and Hector shall be investigated to estimate the potential of an event that would affect the Mojave Mainline and allow for contingency planning.

Terrestrial Biology

Vegetation:

112. Mojave shall notify the Arizona Commission of Agriculture and Horticulture at least 30 days prior to the start of construction, so that the agency can survey the proposed ROW in Arizona and salvage protected plants.

Land Use

113. Mojave shall realign its route to maximize use of existing corridors in the CDCA. The applicant shall use Alternative B as modified by the El Dorado route around Barstow. The route shall also be realigned to avoid Edwards Air Force Base by using Kern River's mainline route in this area.

114. Mojave shall realign its route between the town of Mojave and the floor of the San Joaquin Valley to avoid Tehachapi Mountain Park, the community of Stallion Springs, and the Chanac Creek drainage. This can be accomplished by using either the proposed Kern River or El Dorado routes in this area.

115. Mojave shall cross the Kern River at the location identified for the North Bakersfield Variation to Kern River's proposed project to avoid major impact to Kern River County Park.

System Safety and Reliability

116. Aircraft monitoring of the pipeline ROW for operation and maintenance purposes shall be coordinated with nearby military installations, e.g., Edwards AFB, in order to avoid potential conflict.

117. The residential areas of Indian John Spring and Stallion Springs shall be avoided by rerouting the pipeline corridor. These areas are particularly sensitive since potentially active faults are crossed in this area.

118. The route through Bakersfield shall be carefully selected to avoid or minimize impact on areas zoned residential or recreational.

3.1.14 Staff Recommended Mitigation Measures for the El Dorado Alternative

Geology

General Impact: Volcanic activity may cause damage to the pipeline.

119. The volcanic cinder cones near Amboy and Hector shall be investigated to estimate the potential of an event that would affect the El Dorado Mainline and allow for contingency planning.

Terrestrial Biology

Vegetation:

120. El Dorado shall notify the Arizona Commission of Agriculture and Horticulture at least 30 days prior to the start of construction, so that the agency can survey the proposed ROW in Arizona and salvage protected plants.

Land Use

121. El Dorado shall realign its route to avoid Edwards AFB by using Kern River's proposed route in the area.

System Safety and Reliability

122. Aircraft monitoring of the pipeline ROW for operation and maintenance purposes shall be coordinated with nearby military installations, e.g., Edwards AFB, in order to avoid potential conflict.

123. The route through Bakersfield shall be carefully selected to avoid or minimize impact on areas zoned residential or recreational.

3.1.15 Staff Recommended Mitigation Measures for the El Paso Proposal

Geology

124. The volcanic cinder cones present, if one of the alternative cases is certificated, northwest of Flagstaff, Arizona, shall be investigated to estimate the potential of an event that could affect the El Paso Expansion and allow for contingency planning.

Terrestrial Biology

Vegetation:

125. El Paso shall notify the Arizona Commission of Agriculture and Horticulture at least 30 days prior to construction, so that the agency can survey the proposed ROW in Arizona and salvage protected plants.

Land Use

126. The El Paso 100/500 or 200/400 alternatives would cross the Elden Environmental Study Area along the 4.1 miles of the

Leupp loop west of the Flagstaff Compressor Station. This area shall be avoided by eliminating that section of the loop by appropriate engineering design, either by relocation or increased compression.

Cultural Resources

American Indian Concerns:

127. The Navajo Nation has well-developed policies with regard to archaeological and sacred sites and the disposition of burials. They require a complete inventory of archaeological and sacred sites along the proposed expansion loops. Such an inventory will require both a pedestrian survey of the construction corridor and facility areas as well as interviews with local residents (land-users) and medicine men to fully document the presence of sacred sites. Some of these sites are already on record in local BIA offices. Burials, if encountered, must be identified if possible, and avoided whenever feasible. Reburial is possible when certain conditions are met, however. Archaeological excavation requires a permit from the Navajo Nation. In addition, the various chapters of the Navajo Nation wish to have a voice regarding which side of the original pipeline the proposed expansion loops would be laid. El Paso shall follow the requirements of the Navajo Nation.

3.1.16 Staff Recommended Mitigation Measures for the Northwest Project

Geology

128. No surface disturbance will be allowed within 100 feet of perennial streams within the Grand Junction Resource Area.

Terrestrial Biology

Vegetation:

129. For the protection of the federally listed species, Uinta Basin hookless cactus and spineless hedgehog cactus, the following actions should be undertaken:

- o Prior to construction, the right-of-way, staging areas, and new access roads shall be staked and surveyed for the subject species by conducting field surveys by qualified botanists during the appropriate time of year.

- o Individual plants, populations, and habitat identified adjacent to the staked right-of-way, staging areas, and access roads shall be flagged and signed to alert construction workers to avoid these sensitive areas.

- o Pipeline right-of-way alignment, staging areas, and access roads shall be adjusted to avoid individual plants or habitat of the subject species.
- o Public off-road vehicle use of the right-of-way, staging areas, and access roads, shall be prevented in the vicinity of the known occurrences of these plant taxa and suitable habitat by the use of signs, gates, or fences.
- o Vehicles and equipment will not be permitted outside of the right-of-way, staging areas, and access roads during construction or pipeline operation.

Wildlife:

130. If looping is required on the Northwest system, Northwest shall conduct surveys as required by the USFWS to identify prairie dog colonies in the project area. Where active colonies are found to be impacted by the proposed route, further surveys by a qualified biologist shall be completed to determine the presence or absence of black-footed ferrets. Such surveys shall be done within one year of initial pipeline construction.

131. Black-footed ferret surveys shall be conducted if any rodent control operations are undertaken for prairie dogs in potential ferret habitat. If the most recent survey work for ferrets is less than one year old, then no additional work is required.

3.1.17 Staff Recommended Mitigation Measures for the Transwestern Proposal

Geology

132. The volcanic cinder cones present northwest of Flagstaff, Arizona, shall be investigated to estimate the potential of an event that would affect the Transwestern Expansion and allow for contingency planning.

Soil

133. Transwestern shall implement erosion control measures in the Carlsbad Resource Area (BLM Roswell District) as required by the authorizing officer. One example of such a

measure is the use of water bars with the following guidelines:

- o Simulate the imaginary contour lines of the slope, ideally with a grade of 1 to 2 percent.
- o Drain down and away from the disturbed area.
- o Begin and end in vegetation.
- o Use the following spacing intervals:

Slope (%)	Interval (feet)
less than 2.5	200
2.5 to 5	150
6 to 9	100
more than 9	50

Terrestrial Biology

Vegetation:

134. Transwestern shall notify the Arizona Commission of Agriculture and Horticulture at least 30 days prior to construction, so that the agency can survey the proposed ROW in Arizona and salvage protected plants.

135. Throughout the Carlsbad Resource Area reseeding will be required on all portions of the ROW where blading occurs. Seeding will be done with a disk-type drill. The seeder will be followed by a drag, packer, or rollers to ensure adequate compaction. The seed mixture will consist of:

Species	Pounds per acre of pure live seed
Sand dropseed	0.25
Sand lovegrass (*Eragrostis trichoides*)	0.50
Little bluestem (*Andropogon scoparius*)	0.25

Wildlife:

136. Prior to construction on public lands in the Carlsbad Resource Area, a qualified biologist shall survey all potential raptor habitat within 0.25 mile of the pipeline and identify active and inactive nests. Construction within 0.25 mile of active aeries shall not be permitted during the nesting season (April 1 to September 1 for raptors). Nests shall not be disturbed at any time.

137. Use of heavy equipment or explosives should be restricted in Sections 11 and 12, Township 19 North, Range 20 West, and Section 7, Township 19 North, Range 19 West in Arizona between December 1 and June 30. This should be done to protect bighorn sheep lambing activities.

138. Construction activities in the vicinity of established or suspected migration corridors for desert bighorn sheep shall be timed so as not to conflict with animals during migration. The appropriate state or federal management agency shall be contacted to establish calendar dates which would define the time of construction that would minimize impacts due to disturbance.

Land Use

139. Transwestern Loop G would be on the border of the Fort Valley Experimental Forest in Coconino NF. The loop shall be located on the north side of the existing pipeline in the vicinity of the experimental forest.

140. Transwestern shall inform the Waste Isolation Pilot Project authorities of its pipeline crossing under the north access road and water pipeline.

141. Loop I shall be placed on the south side of the existing line in order to avoid infringement on the Mount Nutt Wilderness Study Area.

Cultural Resources

American Indian Concerns:

142. The Navajo Nation has well developed policies with regard to archaeological and sacred sites and the disposition of burials. They require a complete inventory of archaeological and sacred sites along the proposed expansion loops. Such an inventory will require both a pedestrian survey of the construction corridor and facility areas as well as interviews with local residents (land-users) and medicine men to fully document the presence of sacred sites. Some of these sites are already on record in local BIA offices. Burials, if encountered, must be identified if possible, and avoided whenever feasible. Reburial is possible when certain conditions are met, however. Archaeological excavation requires a permit from the Navajo Nation. In addition, the various chapters of the Navajo Nation wish to have a voice regarding which side of the original pipeline the proposed expansion loops would be laid. Transwestern shall follow the requirements of the Navajo Nation.

3.1.18 Staff Recommended Mitigation Measures for the Kern River Proposal

Geology

143. Avalanche hazards shall be mitigated by routing the pipeline down stable ridgelines to an elevation where the potential for avalanche damage is not significant.

Other mitigations for pipeline protection against avalanche hazards shall include encasing the pipe in a protective housing within the avalanche prone areas or deep burial of the pipe in the high mountain avalanche prone areas.

144. Kern River shall realign its route to use the Wasatch Variation. This would significantly reduce the potential of pipeline rupture and damage to the environment by eliminating segments of the mainline which contain severe slope stability problems.

145. The volcanic cinder cones in the Sevier Desert and Lima Dome areas shall be investigated to determine the potential for an event which could disturb the Kern River Mainline and allow for contingency planning.

Surface Water

146. Trenching through Las Vegas Wash shall be avoided by directionally drilled installation beneath the channel bed. Measures to stabilize the pipeline across the Las Vegas Wash shall be coordinated with the Clark County Wash Development Committee and shall consider the Wetlands Park Master Plan as well as the Master Plan of the Clark County Regional Flood Control District. [This measure will not be necessary if staff's recommendation to use the North Las Vegas Variation is adopted.

147. Construction in the Bear River shall not occur during April, May, or June.

Freshwater Biology

148. Impacts to fish species of special concern shall be sufficiently mitigated through scheduling construction activities so that they do not conflict with migration of spawning species. The appropriate state or federal management agency has guidelines defining calendar dates when activity should not occur for the species in question. Scheduling of construction may vary with the environment and climatological circumstances for any given year.

Terrestrial Biology

Wildlife:

149. Construction activities in the vicinity of established or suspected migration corridors for desert bighorn sheep shall be timed so as not to conflict with animals during migration. The appropriate state or federal management agency shall be contacted to established calendar dates which would define the time of construction that would minimize impacts due to disturbance.

150. Conduct surveys as required by the USFWS to identify prairie dog colonies in the project area. Where active colonies are found to be impacted by the proposed route, further surveys by a qualified biologist shall be completed to determine the presence or absence of black-footed ferrets. Such surveys shall be conducted within one year of initial pipeline construction.

151. Black-footed ferret surveys shall be conducted if any rodent control operations are undertaken for prairie dogs in potential ferret habitat. If the most recent survey work for ferrets is less than one year old, then no additional work is required.

Land Use

152. Kern River shall utilize the North Las Vegas Variation.

System Safety and Reliability

153. Aircraft monitoring of the pipeline ROW for operation and maintenance purposes shall be coordinated with nearby military installations, e.g., Edwards AFB, in order to avoid potential conflict.

154. The route through Bakersfield shall be carefully selected to avoid or minimize impact on areas zoned residential or recreational.

3.1.19 Staff Recommended Mitigation Measure for the WyCal Proposal

155. The WyCal Proposal shall be constructed in the following sequential manner, dependent on the materialization of market conditions:

  A. The segment of the route from Topock, Arizona, to Bakersfield, California. Consideration should be given at that time of increasing the initial section from Topock, Arizona, to Piute Junction, California, from 24-inch to 36-inch O.D. pipeline.

  B. The Transwestern Supply Lateral should be built second, dependent on market conditions.

  C. The segment from Hams Fort, Wyoming, to Piute Junction, California, with the Wasatch Variation and the North Las Vegas Variation (with its 41-mile extension to reconnect with WyCal's proposed route).

3.1.20 New Staff Recommended Measure for All Proposals

156. The successful applicant(s) shall provide site-specific environmental information, including appropriate studies, based on the mitigation measures herein for all gathering and delivery facilities, access roads, and other ancillary facilities at such time as the precise location of these facilities becomes known. This information shall be submitted to the FERC for environmental review and comment. This information shall also be submitted concurrently to the other appropriate federal and state agencies responsible for specific resource management and/or protection to ensure effective and efficient agency/applicant coordination.

3.2 ADDITIONAL MEASURES WHICH THE AGENCIES SOUGHT COMMENT

Twenty-nine additional mitigation measures (not reprinted here) were presented in the DEIR/DEIS for comment on their need, appropriateness, and feasibility. Although some commentors provided a listing of those measures they wanted adopted, there was little or no associated documentation as to their need, appropriateness, and feasibility, as requested. Of the twenty-nine, there was adequate support for Measures H, L, and N in the Draft EIR/EIS. These three have been incorporated into the respective mitigation measure sections of the FEIR/S, Volumes I and II and Section 3.1 of Volume III (see Recommended Measure Nos. 22, 71, and 109).

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